

**KENWOOD**

# **SERVICE MANUAL**

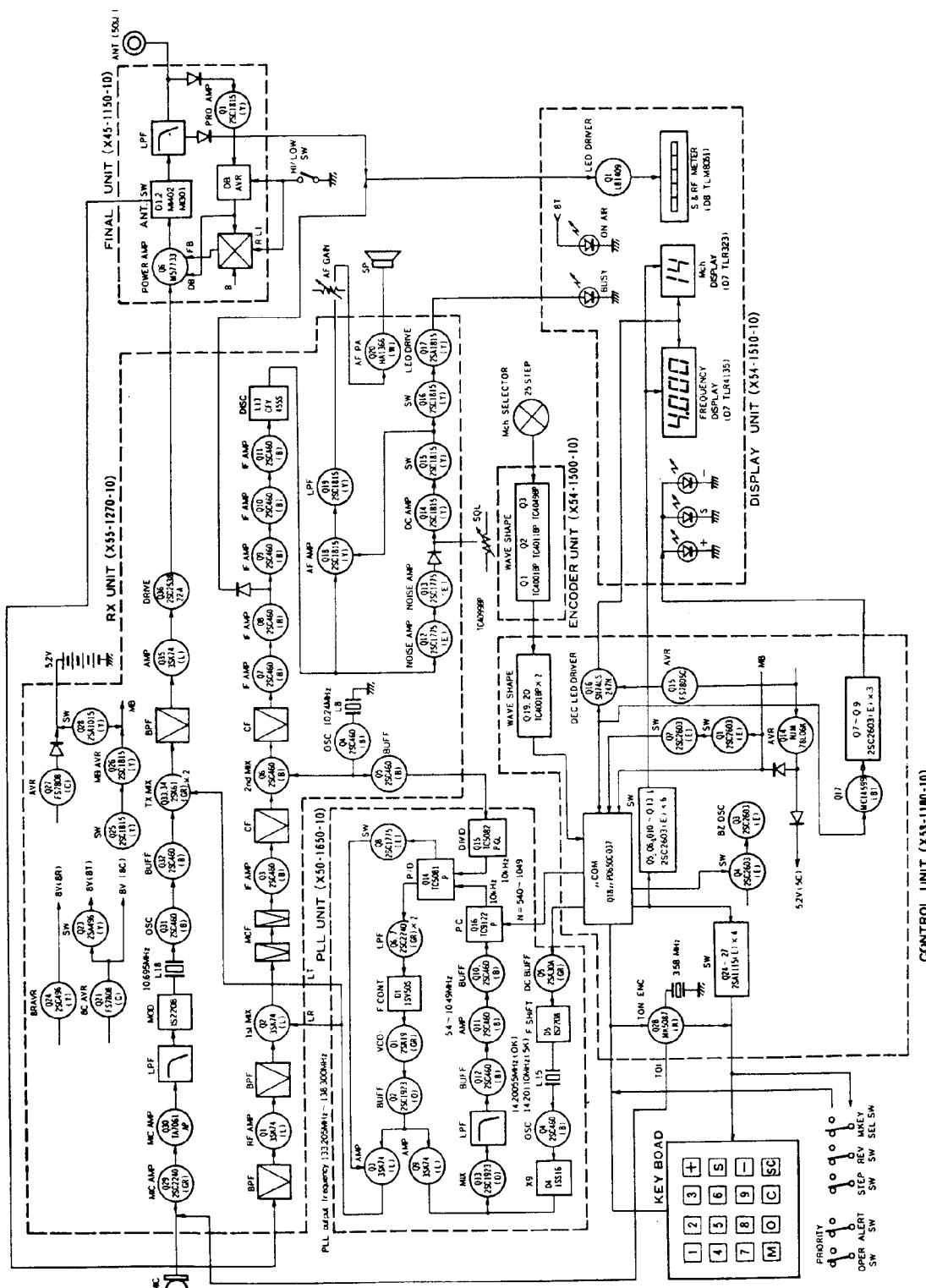
**Model TR-7800**



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## **BLOCK DIAGRAM (K)**



## CIRCUIT DESCRIPTION

### RX Section (X55-1270-10)

The RF signal amplified by the front end dual gate MOS FET Q1 is applied through the helical resonator L3 to Q2 to obtain a 10.695 MHz IF signal.

The output of Q2 passes through the 2-element MCF (monolithic crystal filter to provide an excellent 2-signal characteristic. The IF signal amplified by Q3 is applied to Q6 to produce the 455 kHz 2nd IF signal. This signal is then amplified by Q7-11 and is applied to the ceramic discriminator L13. The output from Q8 (455 kHz amplifier) is fed to the LED level meter for an S meter signal.

The squelch circuit, composed of Q12-15, controls the AF circuit Q18. The busy lamp drive signal and scan busy stop signal (SS) are produced by Q16 and 17 and fed to the busy lamp circuit on the display unit and the scan circuit on the control unit.

The AF signal is amplified by Q18. This is fed to the power amplifier Q20 through the active LPF (low pass filter) Q19 and the AF gain control.

| Item                                  | Symbol         | Condition<br>(Ta = 25°C)                             | Rating |      |      | Unit |
|---------------------------------------|----------------|--|--------|------|------|------|
|                                       |                |  | MIN    | TYP  | MAX  |      |
| DC current with no input              | I <sub>Q</sub> | V <sub>in</sub> = 0                                  | —      | 30.0 | 60.0 | mA   |
| Gain in voltage                       | G <sub>V</sub> | V <sub>in</sub> = -50 dB                             | 50.0   | 52.5 | 55.0 | dB   |
| Output power                          | P <sub>O</sub> | THD = 10%  | 4.5    | 5.5  | —    | W    |
| Distortion                            | THD            | P <sub>O</sub> = 0.5W                                | —      | —    | 1.5  | %    |
| Noise level                           | WBN            | R <sub>g</sub> = 10 kΩ,<br>BW = 20 Hz ~ 20 kHz       | —      | —    | 2.0  | mV   |
| Hum ratio                             | HR             | f = 500 Hz   | 28.0   | —    | —    | dB   |
| Voltage allowance with a shorted load |                | f = 500 Hz<br>V <sub>in</sub> = 10 mV.<br>t = 5 sec. | 16.0   | —    | —    | V    |

| Rank                | 1           | 2           | 3           |
|---------------------|-------------|-------------|-------------|
| G <sub>V</sub> (dB) | 50.0 ~ 52.2 | 51.4 ~ 53.6 | 52.8 ~ 55.0 |

Table 1. HA1366W (RX Unit: Q20)

| Item                                       | Rating   |
|--|--|
| Nominal center frequency (f <sub>0</sub> ) | 10.695 MHz   |
| Pass bandwidth                             | ±7.5 kHz or more at 3 dB   |
| Attenuation bandwidth                      | ±25 kHz or less at 40 dB<br>±45 kHz or less at 60 dB   |
| Guaranteed attenuation                     | 1. 70 dB or more within ±1 MHz<br>2. Spurious level = 40 dB or more at f <sub>0</sub> ~ f <sub>0</sub> + 500 kHz<br>3. Spurious level = 80 dB or more at f <sub>0</sub> - (910 kHz ± 10 kHz) |
| Ripple Loss                                | 1.0 dB or less<br>1.5 dB or less   |
| Impedance                                  | 3 kΩ/0 pF  |

Table 2. MCF (L71-0216-05)  
(RX Unit : XF1)

| Item                       | Rating  |
|----------------------------|---|
| Nominal center frequency   | A: 10.7 MHz (RED)<br>B: 10.67 MHz (BLUE)<br>C: 10.73 MHz (ORANGE)<br>D: 10.64 MHz (BLACK)<br>E: 10.76 MHz (WHITE) |
| 3 dB bandwidth             | 280 ± 50 kHz  |
| 20 dB bandwidth            | 650 kHz or less   |
| Ripple                     | 0.5 dB or less  |
| Loss                       | 6 dB or less  |
| Spurious response          | 30 dB or more at 9 ~ 12 MHz   |
| Input and output impedance | 330Ω  |

Table 3 Ceramic filter (L72-0014-05) SFE10.7MA5  
(RX unit: L7)

| Item  | Rating            |
|---|-------------------|
| Nominal center frequency                      | 455 kHz ± 1 kHz   |
| 6 dB bandwidth                                | ±6 kHz or more    |
| 50 dB bandwidth                               | ±12.5 kHz or less |
| Ripple (within 455 ± 4 kHz)                   | 3 dB or less      |
| Loss  | 6 dB or less      |
| Guaranteed attenuation (within 455 ± 100 kHz) | 35 dB or more     |
| Input and output impedance                    | 2.0 kΩ            |

Table 4. Ceramic filter (L72-0315-05) CFW455F  
(RX Unit: L10)

### TX Section (X55-1270-10, X45-1150-10)

The microphone and Touch Tone signals are amplified by Q29 and fed to the FM modulator vari-cap diode D20 through the MIC amplifier Q30 and splatter filter to produce an FM signal. The 10.695 MHz signal from the oscillator circuit Q31 is applied to the transmit balanced mixer (Q33, Q34) via buffer amplifier Q32. The 144 MHz signal obtained from the balanced mixer is fed through the 4-stage BPF (with voltage variable tuning) to eliminate unwanted spurious components.

This signal is then amplified by Q35 and 36 to drive the final unit. Both Q36 and the Final unit are powered by the DB Line, which also functions at low power and during protection. The DB circuit is a 12.4V AVR (Automatic Voltage Regulator) circuit using Q2-5 and D5.

The signal to the Final unit is power amplified by the power hybrid Q6. It passes through the transmit/receive antenna switch diodes D1, D2, harmonics are eliminated by LPF (Low Pass Filter), and the signal is then applied to the ANT terminal.

The protection circuit is an automatic reset VSWR detector. DB voltage is dropped by driving Q1 with the reflected output component. Low power control is effected by RL1, which switches the power hybrid FB terminal over to the DB line. Power is reduced to 5W by controlling the DB line with VR4.

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## CIRCUIT DESCRIPTION

| Item                       | Symbol  | Tc (°C) | Rating       |
|----------------------------|---------|---------|--------------|
| Operating voltage          | Vcc     | 25      | 17V          |
| DC current                 | Icc     | 25      | 6A           |
| Operating case temperature | Tc (op) | —       | -30 ~ +110°C |
| Storage temperature        | Tstg    | —       | -40 ~ +110°C |
| Base bias voltage          | VBB     | 25      | 10V          |

Table 5. Power module (V30-1171-60) M57733  
MAX Rating (Final Unit : Q6)

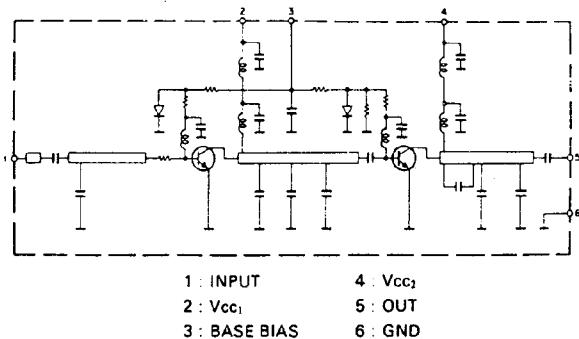


Fig. 1 Power module (V30-1171-60) Equivalent Circuit

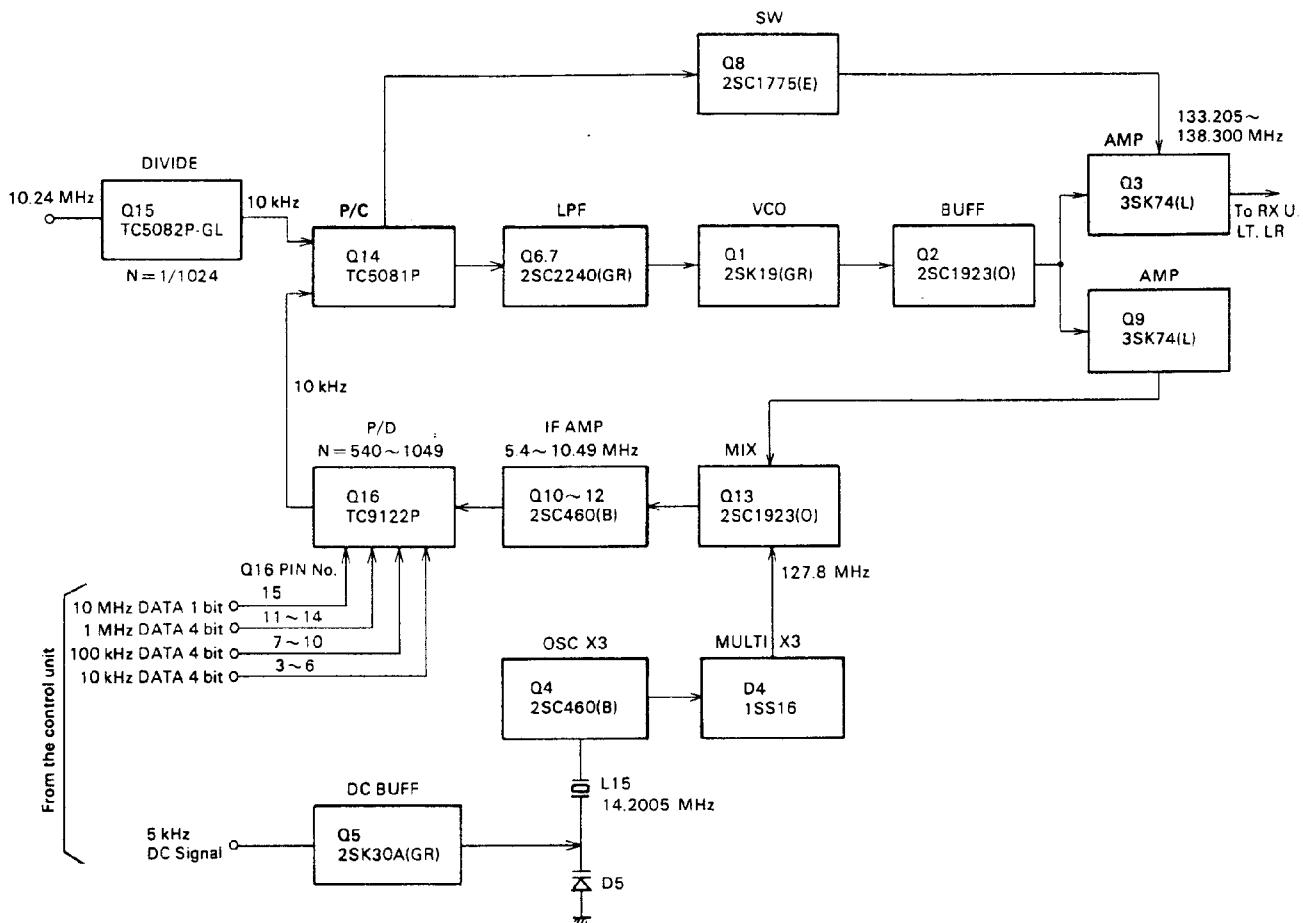


Fig. 2 PLL Unit (X50-1650-10) block diagram

## CIRCUIT DESCRIPTION

### S Meter Circuit (X54-1510-10)

The digital S meter circuit uses ICs and LEDs to indicate input signal strength.

When the receive signal is about 0 dB $\mu$ , the first LED will light. Refer to S meter sensitivity on page 33 for the signal level at which each LED lights. When the signal level is about 20-30 dB, all LEDs will light. In the transmit mode, 5 LEDs will light at "Hi" power, and 3 LEDs at "Low" power.

### **Backup Circuit (X55-1270-10)**

1. Backup, power cord connected.

When the power cable is connected to the vehicles battery, 13.8V is available at the BB terminal even at Power switch OFF; this AVR circuit (Q26, D16 and D17) supplies 5.2V to the MB terminal.

When the Power switch is ON, Q26 is turned OFF by Q25 and memory power is available directly from the control unit.

- ## 2. Backup, power cable disconnected.

With Ni-Cd cells installed in the battery case, Q28 is turned ON, and 5.2V is fed from the BT line through Q28 to the MB line. When the Power switch is ON, the 8V AVR circuit is activated by Q27 and the Ni-Cd's are charged through R94 and D19.

- ### 3 Backup Hold Time

- 1) During engine start-up, voltage at the battery terminal drops. C6 and C7 in the control unit afford about 1.5 sec of backup time.

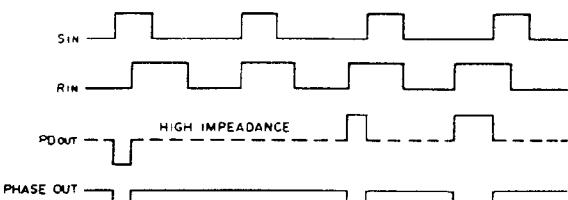


Fig. 3 TC5081P (PLL Unit : Q14)  
Phase comparator timing chart

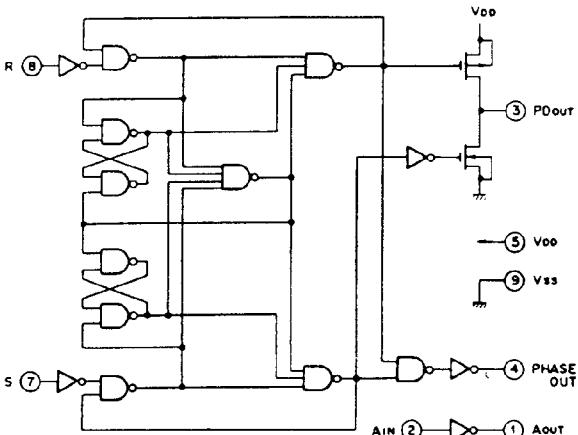


Fig. 4 TC5081P (PLL Unit : Q14)

- 2) When the Ni-Cd batteries are fully charged, the backup hold time is about 1 week max. And normally about 5 days.
  - 3) If backup greater than 1 week is required, 13.8V DC  $\pm 20\%$  should be applied through the Ext. Backup terminal.

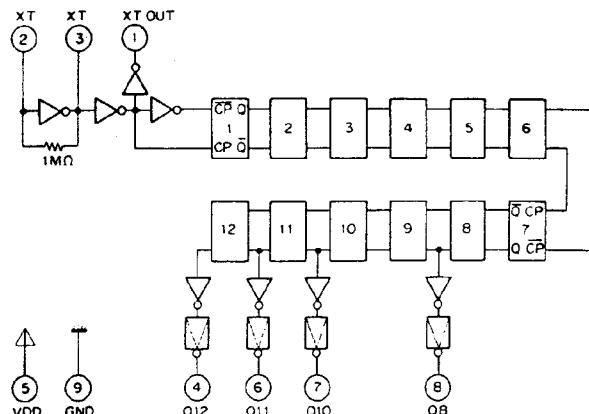


Fig. 5 TC5082P-GL (PLL UNIT: Q15)

| PIN NO                              | 8      | 7        | 6        | 4        | 1            |
|-------------------------------------|--------|----------|----------|----------|--------------|
| PIN NAME                            | $Q_8$  | $Q_{10}$ | $Q_{11}$ | $Q_{12}$ | $X_{out}$    |
| Dividing ratio                      | 1/256  | 1/1024   | 1/2048   | 1/4096   | 1/1          |
| Output frequency<br>X-tal 10.24 MHz | 40 kHz | 10 kHz   | 5 kHz    | 2.5 kHz  | 10.24<br>MHz |

Table 6. TC5082P-GL (PLL Unit: Q15)

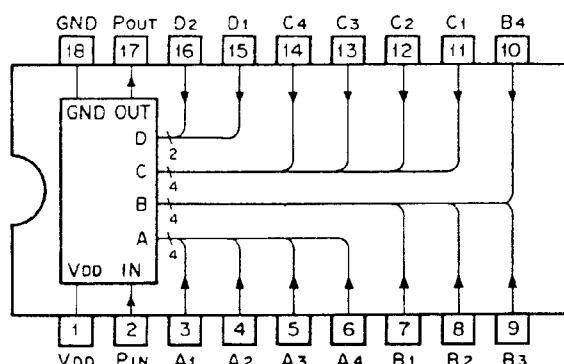


Fig. 6 TC9122P (PLL Unit : Q16)

Table 7. Functions of TC 9122P (PLL Unit : Q16)

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## CIRCUIT DESCRIPTION

Table. 8 Micro-Processor Functions ( $\mu$ PD650C-037 Control Unit, Q18)

| Terminal No. | Name of terminal | Input signal | Output signal | Description   | Pulse |
|--------------|------------------|--------------|---------------|---|-------|
| 1            | CL1              |              |               | Clock frequency: 346 kHz  |       |
| 2            | PC0              | ○            |               | Normal: L<br>Transmit: H  |       |
| 3            | PC1              | ○            |               | Squelch open: H<br>Squelch OFF: L                                       |       |
| 4            | PC2              |              | ○             | PO, PA, MR, ST common output<br>CH display: 10-digit signal             | ○     |
| 5            | PC3              |              | ○             | Rev., TX OFFSET, 600/700<br>common output CH display:<br>1-digit signal |       |
| 6            | INT              | ○            |               | Normal: H   |       |
| 7            | RES              | ○            |               | Normal: L   |       |
| 8            | PDO              |              | ○             | Display BCD output A:<br>Latch address output A0                        | ○     |
| 9            | PD1              |              | ○             | Display BCD output B:<br>Latch address output A1                        | ○     |
| 10           | PD2              |              | ○             | Display BCD output C:<br>Latch address output A2                        | ○     |
| 11           | PD3              |              | ○             | Display BCD output D:<br>Latch data output D                            | ○     |
| 12           | PE0              |              | ○             | Frequency display, 1 kHz<br>digit: CL, 0, MW touch tone<br>R4           | ○     |
| 13           | PE1              |              | ○             | Frequency display, 10 kHz<br>digit: 7, 8, 9 touch tone R3               | ○     |
| 14           | PE2              |              | ○             | Frequency display, 100 kHz<br>digit: 4, 5, 6 touch tone R2              | ○     |
| 15           | PE3              |              | ○             | Frequency display, 1 MHz<br>digit: 1, 2, 3 scan touch<br>tone R2        | ○     |
| 16           | PF0              |              | ○             | PLL data output, 10 kHz<br>digit: L at 146.000                          |       |
| 17           | PF1              |              | ○             | PLL data output, 10 kHz<br>digit: L at 146.000                          |       |
| 18           | PF2              |              | ○             | PLL data output, 10 kHz<br>digit: L at 146.000                          |       |
| 19           | PF3              |              | ○             | PLL data output, 10 kHz<br>digit: L at 146.000                          |       |
| 20           | TEST             |              |               | Power supply, 5V  |       |
| 21           | VCC              |              |               | Power supply, 5V  |       |
| 22           | PG0              |              | ○             | PLL data output, 100 kHz<br>digit: H at 146.000                         |       |

| Terminal No. | Name of terminal | Input signal | Output signal | Description   | Pulse |   |   |     |    |   |   |     |  |   |   |   |  |
|--------------|------------------|--------------|---------------|---|-------|---|---|-----|----|---|---|-----|--|---|---|---|--|
| 23           | PG1              |              | ○             | PLL data output, 100 kHz<br>digit: L at 146.000   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 24           | PG2              |              | ○             | PLL data output, 100 kHz<br>digit: H at 146.000   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 25           | PG3              |              | ○             | PLL data output, 100 kHz<br>digit: L at 146.000   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 26           | PH0              |              | ○             | PLL data output, 1 MHz digit:<br>H at 146.000   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 27           | PH1              |              | ○             | PLL data output, 1MHz digit:<br>H at 146.000  |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 28           | PH2              |              | ○             | PLL data output, 1 MHz digit:<br>H at 146.000   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 29           | PH3              |              | ○             | PLL data output, 1 MHz digit:<br>L at 146.000   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 30           | PI0              |              | ○             | PLL data output, 5 kHz  |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 31           | PI1              |              | ○             | PLL data output, 10 MHz   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 32           | PI2              |              | ○             | Latch timing pulse output   | ○     |   |   |     |    |   |   |     |  |   |   |   |  |
| 33           | PA0              | ○            |               | Rotary encoder UP input   | ○     |   |   |     |    |   |   |     |  |   |   |   |  |
| 34           | PA1              | ○            |               | Rotary encoder DOWN input   | ○     |   |   |     |    |   |   |     |  |   |   |   |  |
| 35           | PA2              | ○            |               | MIC UP input; UP at L. Stops<br>when both are L   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 36           | PA3              | ○            |               | MIC DOWN input; DOWN at L.<br>Stops when both are L   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 37           | PB0              | ○            |               | 700 at H of 600/700<br>selector, C3 5 kHz at H of<br>step selector, C2<br>Scan input E3<br>Destination  |       |   |   |     |    |   |   |     |  |   |   |   |  |
|              |                  |              |               | <table border="1"> <tr> <td>E0</td><td>1</td><td>0</td><td>1.0</td></tr> <tr> <td>E1</td><td>1</td><td>0</td><td>0.0</td></tr> <tr> <td></td><td>K</td><td>X</td><td>W</td></tr> </table> | E0    | 1 | 0 | 1.0 | E1 | 1 | 0 | 0.0 |  | K | X | W |  |
| E0           | 1                | 0            | 1.0           |   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| E1           | 1                | 0            | 0.0           |   |       |   |   |     |    |   |   |     |  |   |   |   |  |
|              | K                | X            | W             |   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 38           | PB1              | ○            |               | Reverse input C3, MW input E0:<br>MR input C2<br>7E1, 4E2, 1E3, touch tone B1   |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 39           | PB2              | ○            |               | $\ominus$ shift input C3:<br>P.O input, C2<br>0E0, 8E1, 5E2, 2E3:<br>Touch tone B2  |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 40           | PB3              | ○            |               | $\oplus$ shift input C3, touch tone<br>B3: P.A input C2<br>CL, E0, 9E1, 6E2, 3E3: Simplex<br>input C3 (common to B2)  |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 41           | VSS              |              |               | Earth (Ground)  |       |   |   |     |    |   |   |     |  |   |   |   |  |
| 42           | CL               |              |               | Clock frequency: 346 kHz  |       |   |   |     |    |   |   |     |  |   |   |   |  |

### PLL Unit (X50-1650-10)

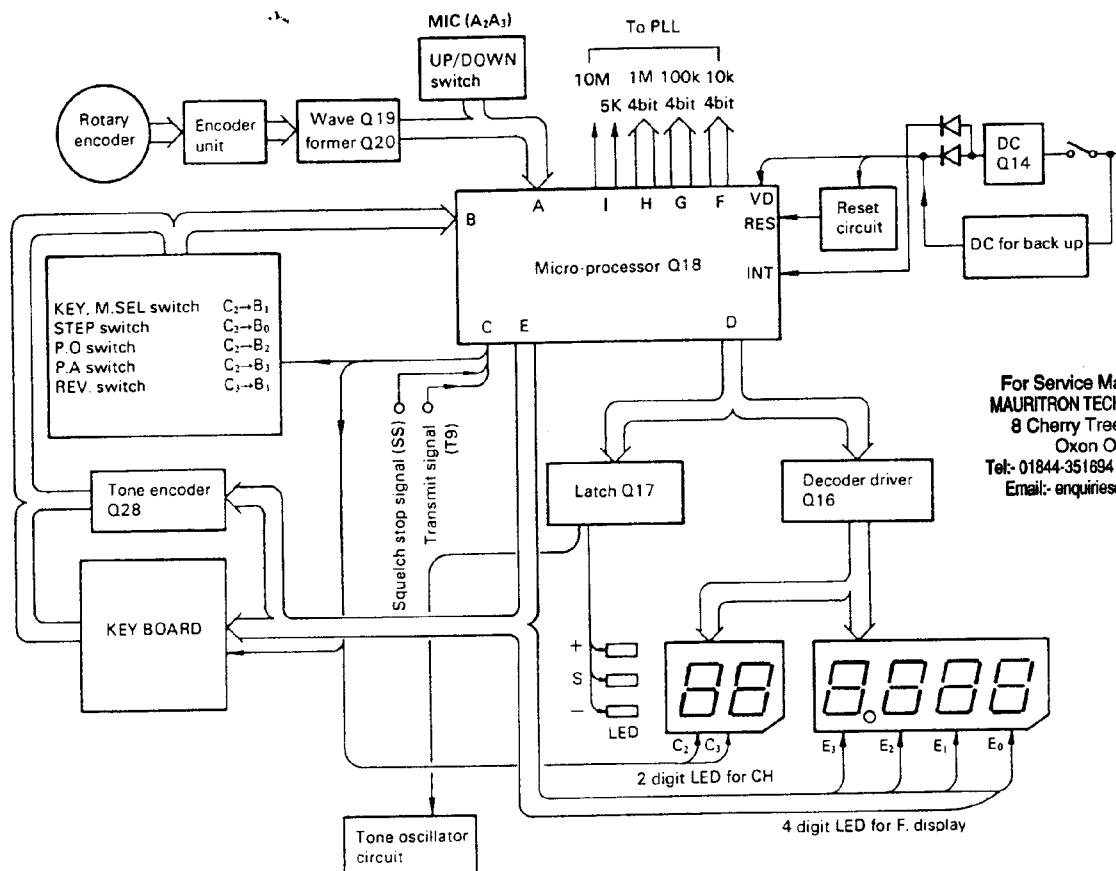
Fig. 2 shows a basic block diagram of the PLL circuit. The VCO signal from Q1 is buffered by Q2 and amplified by Q9. It is then mixed with the heterodyne signal by Q13 to produce a 5.4 — 10.49 MHz signal.

This signal is filtered and then amplified by Q12-10, and then frequency divided by Q16 according to the binary data (10 MHz, 1 MHz, 100 kHz and 10 kHz order) from the control unit to obtain a 10 kHz step signal.

The 10.24 MHz signal from the RX unit is frequency divided

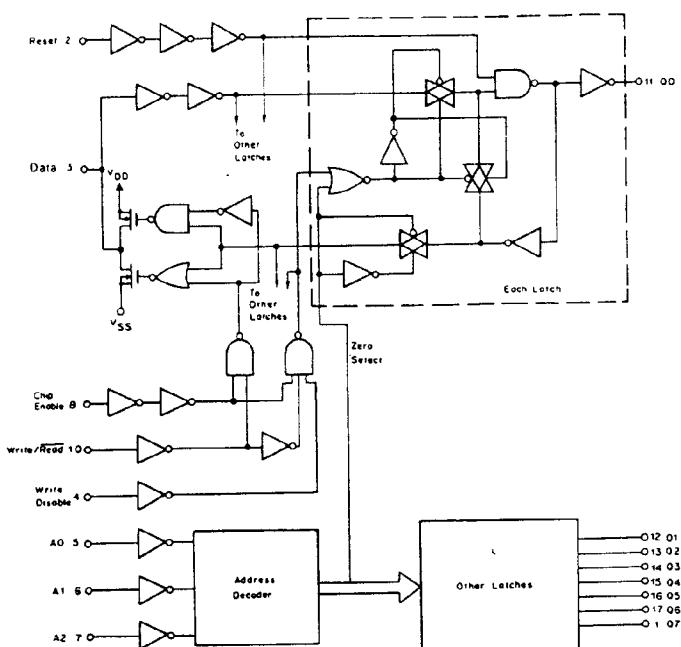
1/1024 by Q15 to a 10 kHz reference signal is then phase detected by Q14. This signal, through low pass filters Q6 and Q7, is applied via the CV line to the vari-cap diodes D21-24 in the RX unit as a control voltage. In the VCO HET circuit, a 14.2 MHz crystal controlled signal is generated by OSC Q4, and is multiplied 9X by D4 to obtain 127.8 MHz signal, which is applied to the mixer Q13. Vari-cap D5 in the crystal oscillator circuit shifts the oscillator frequency +5 kHz through the Q5 source voltage variation, derived from the control unit 5 kHz DC signal.

## CIRCUIT DESCRIPTION



For Service Manuals Contact  
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 Email: [enquiries@mauritron.co.uk](mailto:enquiries@mauritron.co.uk)

Fig. 7 Control Unit block diagram



| Chip Enable | Write/Read | Write Disable | Reset | Addressed Latch | Other Latches | Data Pin |
|-------------|------------|---------------|-------|-----------------|---------------|----------|
| 0           | x          | x             | 0     | .               | .             | Z        |
| 1           | 1          | 0             | 0     | Data            | .             | Input    |
| 1           | 1          | 1             | 0     | .               | .             | Z        |
| 1           | 0          | x             | 0     | .               | .             | Qn       |
| x           | x          | x             | 1     | 0               | 0             | Z/0      |

x = Don't care.  
 . = No change in state of latch.  
 Z = High impedance.  
 Qn = State of addressed latch.

Table 9. Truth table (Control Unit: Q17)

Fig. 8 Function diagram of MC14599B (Control Unit: Q17)

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## CIRCUIT DESCRIPTION

Table 10. Control Unit Q16 (SN74LS247N) function

| DECIMAL OR FUNCTION | INPUTS |   |     |   |   | BI/RBO | OUTPUTS |     |     |     |     |     |     |     |
|---------------------|--------|---|-----|---|---|--------|---------|-----|-----|-----|-----|-----|-----|-----|
|                     | L      | T | RBI | D | C | B      | A       | a   | b   | c   | d   | e   | f   | g   |
| 0                   | H      | H | L   | L | L | L      | H       | ON  | ON  | ON  | ON  | ON  | ON  | OFF |
| 1                   | H      | X | L   | L | L | H      | H       | OFF | ON  | OFF | OFF | OFF | OFF | OFF |
| 2                   | H      | X | L   | L | H | L      | H       | ON  | ON  | ON  | ON  | OFF | ON  | ON  |
| 3                   | H      | X | L   | H | H | H      | H       | ON  | ON  | ON  | OFF | ON  | ON  | ON  |
| 4                   | H      | X | L   | H | L | L      | H       | OFF | ON  | ON  | OFF | OFF | ON  | ON  |
| 5                   | H      | X | L   | H | L | H      | H       | ON  | OFF | ON  | ON  | OFF | ON  | ON  |
| 6                   | H      | X | L   | H | H | L      | H       | ON  | ON  | ON  | ON  | ON  | ON  | OFF |
| 7                   | H      | X | L   | H | H | H      | H       | ON  | ON  | OFF | OFF | OFF | ON  | ON  |
| 8                   | H      | X | H   | L | L | L      | H       | ON  |
| 9                   | H      | X | H   | L | L | H      | H       | ON  | ON  | ON  | OFF | ON  | ON  | ON  |
| 10                  | H      | X | H   | L | H | L      | H       | OFF | OFF | OFF | ON  | ON  | OFF | ON  |
| 11                  | H      | X | H   | L | H | H      | H       | OFF | OFF | OFF | OFF | OFF | OFF | ON  |
| 12                  | H      | X | H   | H | L | L      | H       | OFF | ON  | OFF | OFF | OFF | ON  | ON  |
| 13                  | H      | X | H   | H | L | H      | H       | ON  | OFF | OFF | ON  | ON  | ON  | ON  |
| 14                  | H      | X | H   | H | H | L      | H       | OFF | OFF | ON  | ON  | ON  | ON  | ON  |
| 15                  | H      | X | H   | H | H | H      | H       | OFF |
| BT                  | X      | X | X   | X | X | X      | L       | OFF |
| RBI                 | L      | X | X   | X | X | X      | H       | ON  |
| LT                  |        |   |     |   |   |        |         |     |     |     |     |     |     |     |

MK5087 (N) (Control Unit Q28)

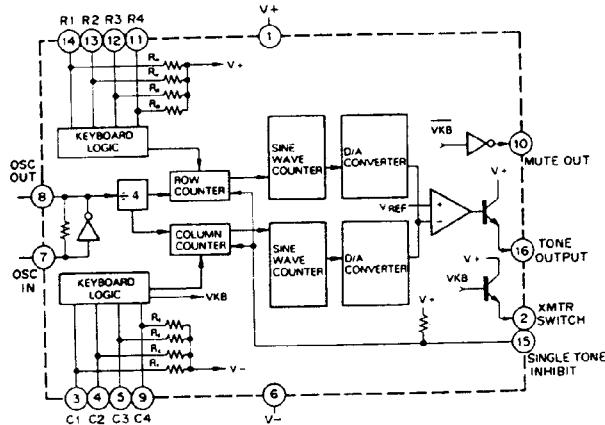


Fig. 9

### Control Unit (X53-1180-10)

The Control unit has an LED dynamic display to indicate frequency in 4 digits and storage channels in 2 digits. The BCD (Binary Coded Decimal) data in the micro-computer D port (pins 8-11) are converted into 7-segment data by the decoder driver Q16. Frequencies are displayed by the E port (pins 12-15), and channels by the C2 and C3 ports (Pins 4, 5), switching Q10-Q13 and Q5-Q6. TX OFFSET is displayed when the dynamic data from the D port is latched by Q17. The display lights in static mode through Q7-Q9.

#### PLL Data Output

The BCD codes for 10k, 100k and MHz are output from the F, G, and H ports (pins 16-19, 22-29) as PLL data output. The lo port is 5k/bit and the 11 port is 10M/bit. The data in the I2-F0 are 0550 for 4000, 0551 for 4005, 0650 for 5000, and 3495 for 8795.

#### Reset Circuit

The reset circuit is a voltage detector. When the voltage exceeds about 3.5V, Q1 is ON and Q2 is OFF, thereby applying pulses to Q18 pin 7 through the differentiation circuit C10 and R5 to reset the circuit.

#### Tone Oscillator Circuit

When the latch Q17 pin 17 goes H, Q4 turns ON to activate the tone generator.

#### Switch Circuits

Each switch functions when dynamic pulses from the micro-computer are input. Diodes are used to prevent reverse current flow.

#### Power Supply Circuits

The micro-computer power supply is Q14, a 6V AVR. Diode D3 provides reverse flow protection. Display power is Q15, a 5V AVR.

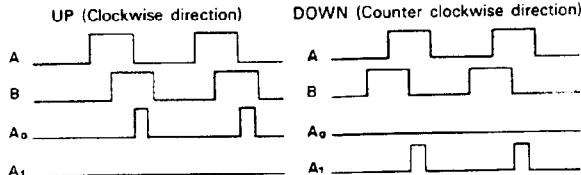


Fig. 10 Encoder input timing chart

#### Encoder Input

The encoder (25 clicks/turn) is a mechanical ON/OFF switch having a phase difference. The encoder circuit, Q19 and Q20 are used to prevent chatter and to shape waveform. A right turn inputs pulses to the A0 port (33), and a left turn to the A1 port (pin 34).

#### UP/DOWN

The micro-computer UP/DOWN inputs A2 (pin 35) and A3 (pin 36) are connected to the microphone switches and are normally H. The UP/DOWN function is effected at L.

Table 11.

|         | 697 Hz | 770 Hz | 852 Hz |
|---------|--------|--------|--------|
| 1209 Hz | 1      | 2      | 3      |
| 1336 Hz | 4      | 5      | 6      |
| 1477 Hz | 7      | 8      | 9      |
| 1633 Hz | M *    | O      | C #    |

#### Tone Encoder Circuit

In transmit mode, Q28 MK5078N is operated by the 8T (power) line. Q24-Q27 are OFF so the pulse signal from the micro-computer Q18 is cut off. By pressing buttons 1-9, O, C and M on the key board, the logical level is inverted; Q28 3-5 becomes L and 11-14 becomes H to produce 2-tone output at pin 16. Tone output deviation is adjustable by VR1. Table 11 shows the frequencies of the two signals.

#### Backup Circuit

When the power cable is connected to the power supply or batteries are installed, the CB line is at 0V and the MB line is 5V at the power switch OFF position. Pins 6 and 35 of micro-processor Q18 ( $\mu$ PD650C-037) are switched from H to L, thereby operating the backup circuit. At this time, all terminals of Q18 are set to L except for pins 1, 20, 21, 42. The backup function is reset when pin 35 becomes H.

**Encoder Unit (X54-1500-10)**

The memory channel selector (25 clicks/turn) is a mechanical ON/OFF switch which phase inverts according to the direction of rotation. It is a Schmidt circuit using Q3 (6 inverter gates) to waveform shape the pulses at terminals EA and ED.

By using Q2 (4 NAND gates) and Q1 (4 NOR gates), the

rising and falling portions of the pulse are detected and fed to the terminals A, B, C and D. The signal is applied to Q19 of the control unit to separate the pulse by the rotational direction. The separated pulse width is set to about 3m sec by the one shot circuit Q20 to input the signal to the micro-processor Q18.

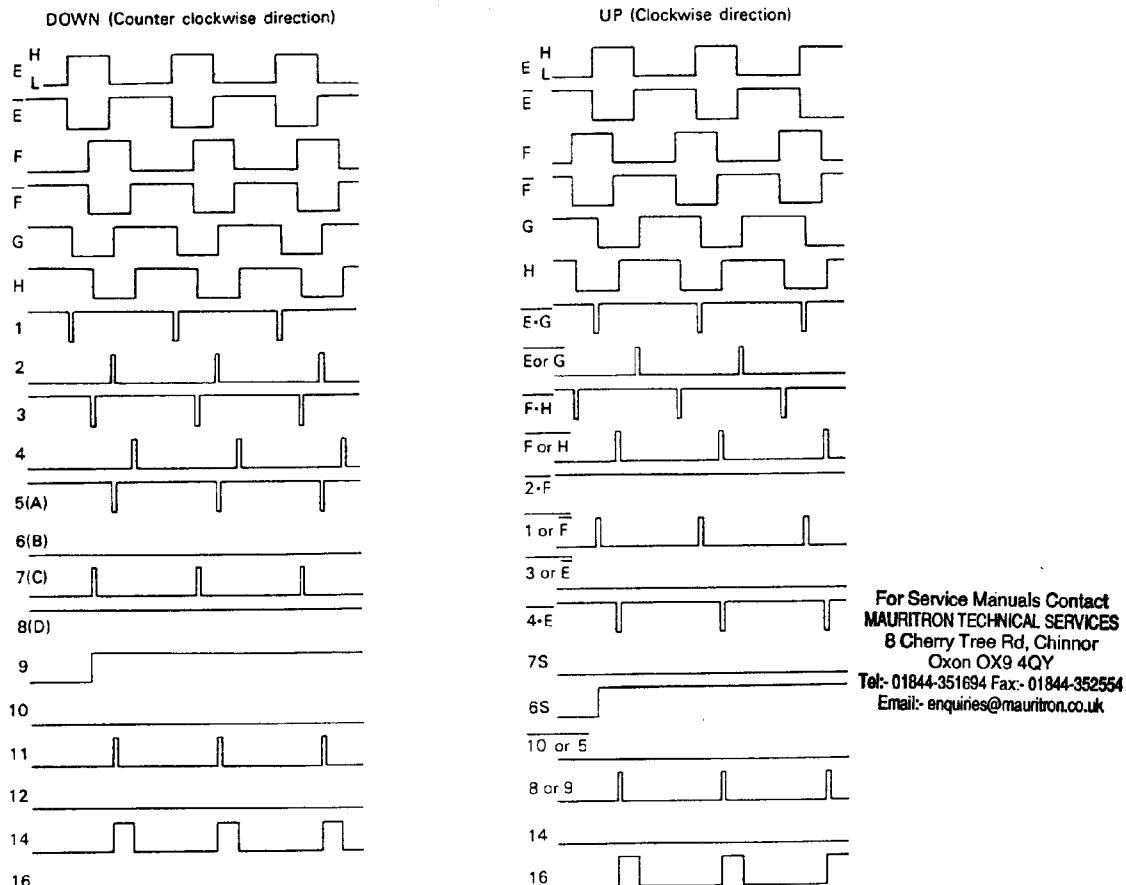


Fig. 11 Encoder Unit timing chart

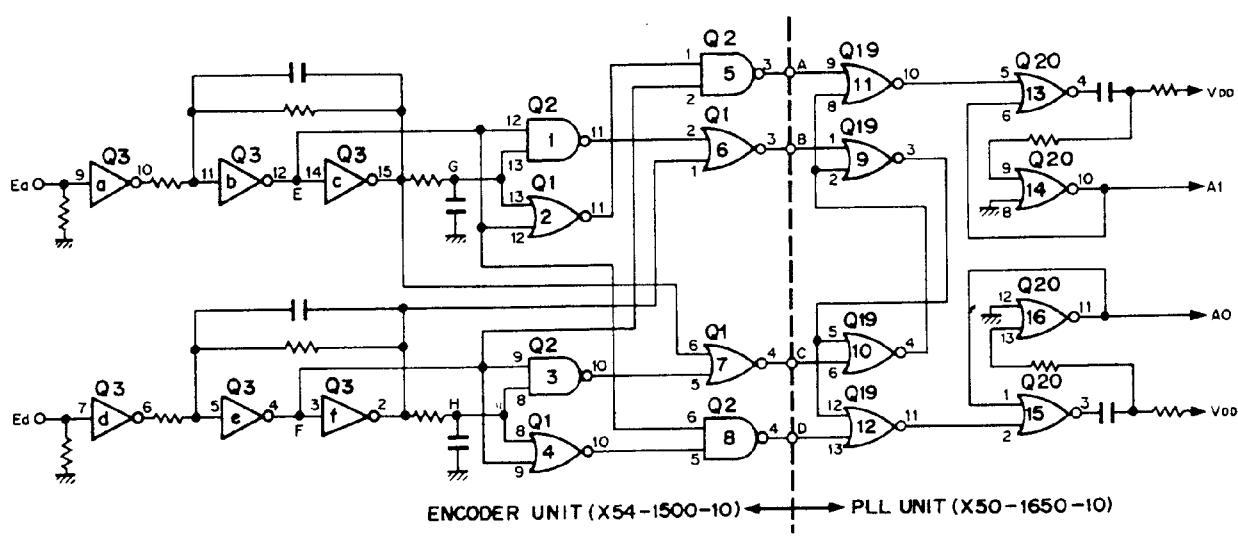
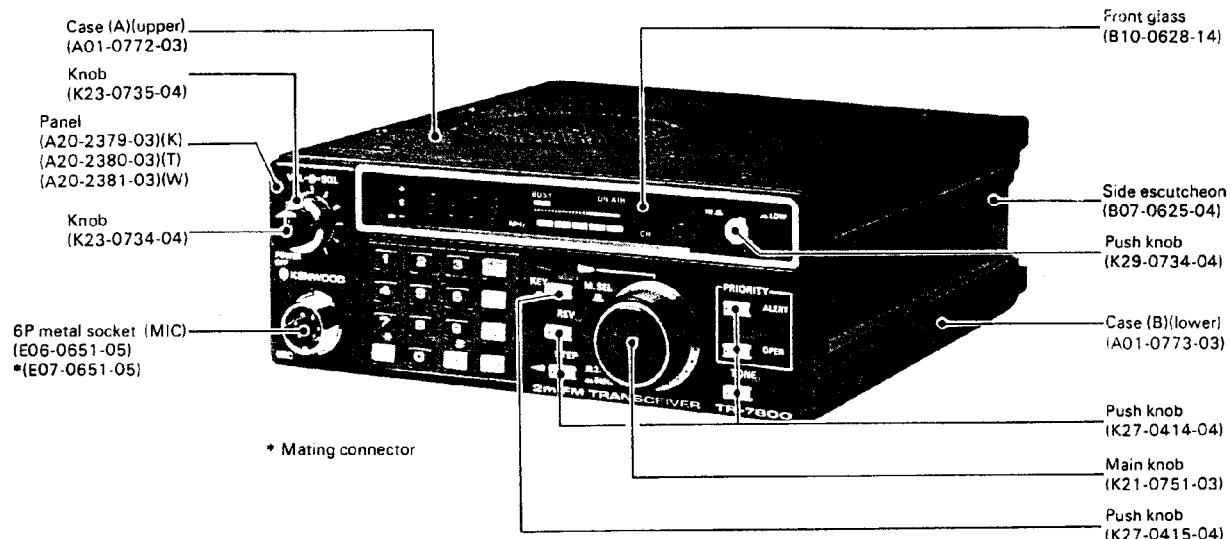


Fig. 12 Encoder, PLL Unit circuit diagram

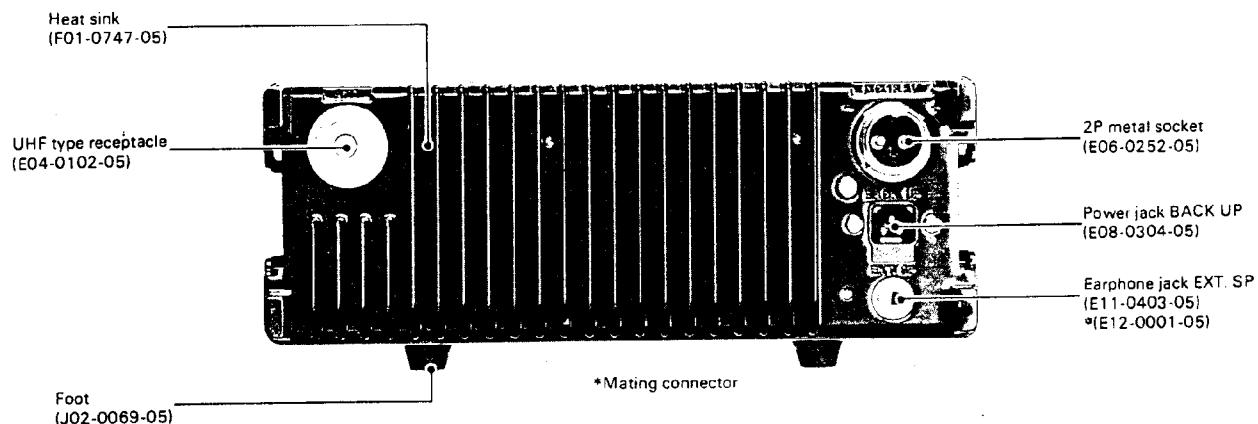
# TR-7800

## OUTSIDE VIEWS

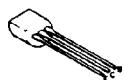
### <FRONT PANEL>



### <REAR PANEL>



2SC1815(Y)  
2SC2240(GR)  
2SC1775(E)



2SA496(Y)



2SD880(Y)



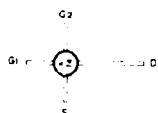
2SK19(GR)



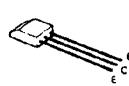
2SC1923(O)



3SK74(L)



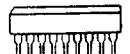
2SC460(B)



2SK30A(GR)

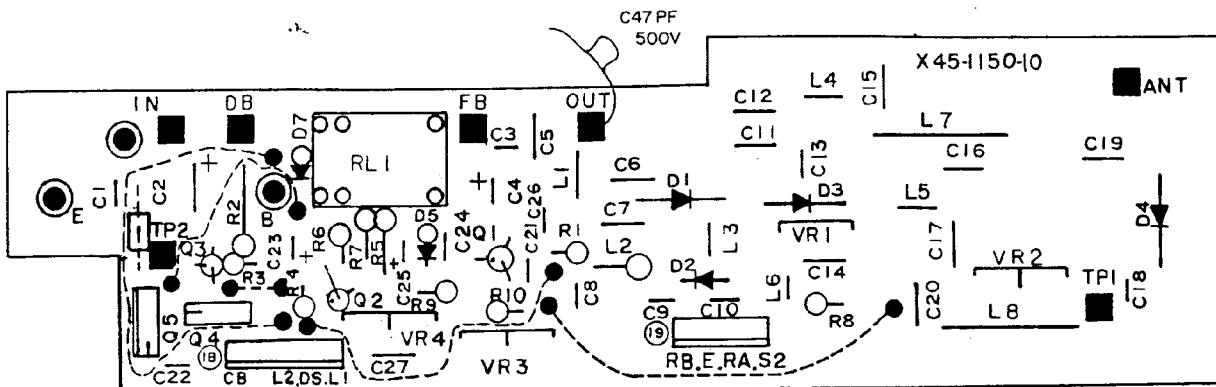


TC5082P-GL  
TC5081P

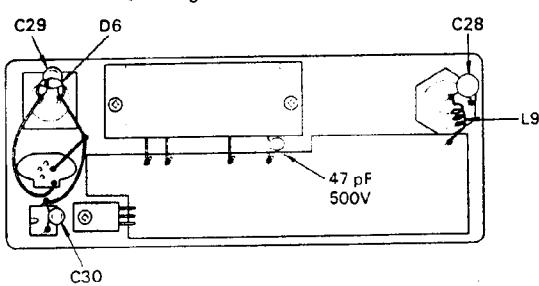


## PC BOARD VIEWS

▼ FINAL UNIT (X45-1150-10) Parts list: Page 16



&lt;Wiring on the Heat Sink&gt;



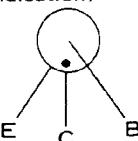
## Note:

1. Solder the leads of the power module without applying stress to them.  
2. Install C28 and L9 as short as possible.

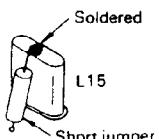
Q1~3 2SC1815(Y) Q4 2SA496(Y) Q5 2SD880(Y)  
Q6 M57733 D1.MI402 D2 MI301 D3,4,IN60  
D5 XZ 064 D6 U15B D7 IS1555

**NOTES:**  
All printed circuit views are component side.

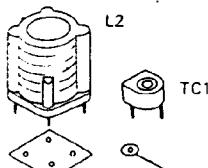
[Transistor Terminal Indication]



&lt;Attachment method of L15&gt;



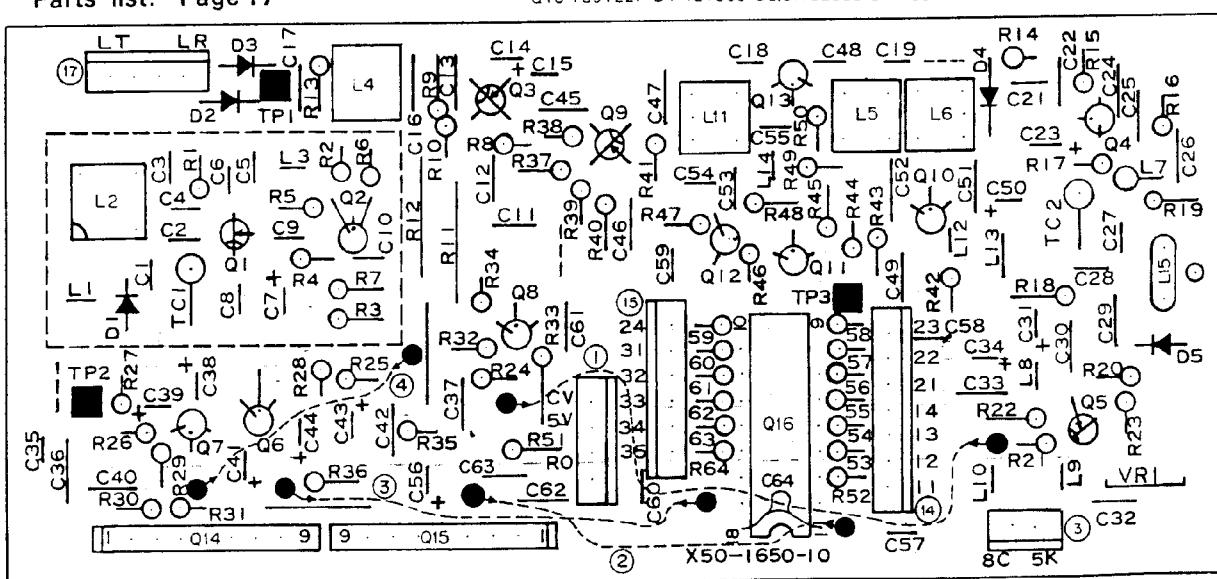
&lt;Attachment direction of TC1 and L2&gt;



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MAURITRON TECHNICAL SERVICES  
8 Cherry Tree Rd, Chinnor  
Oxon OX9 4QY  
Tel:- 01844-351694 Fax:- 01844-352554  
Email:- enquiries@mauritron.co.uk

▼ PLL UNIT (X50-1650-10)  
Parts list: Page 17

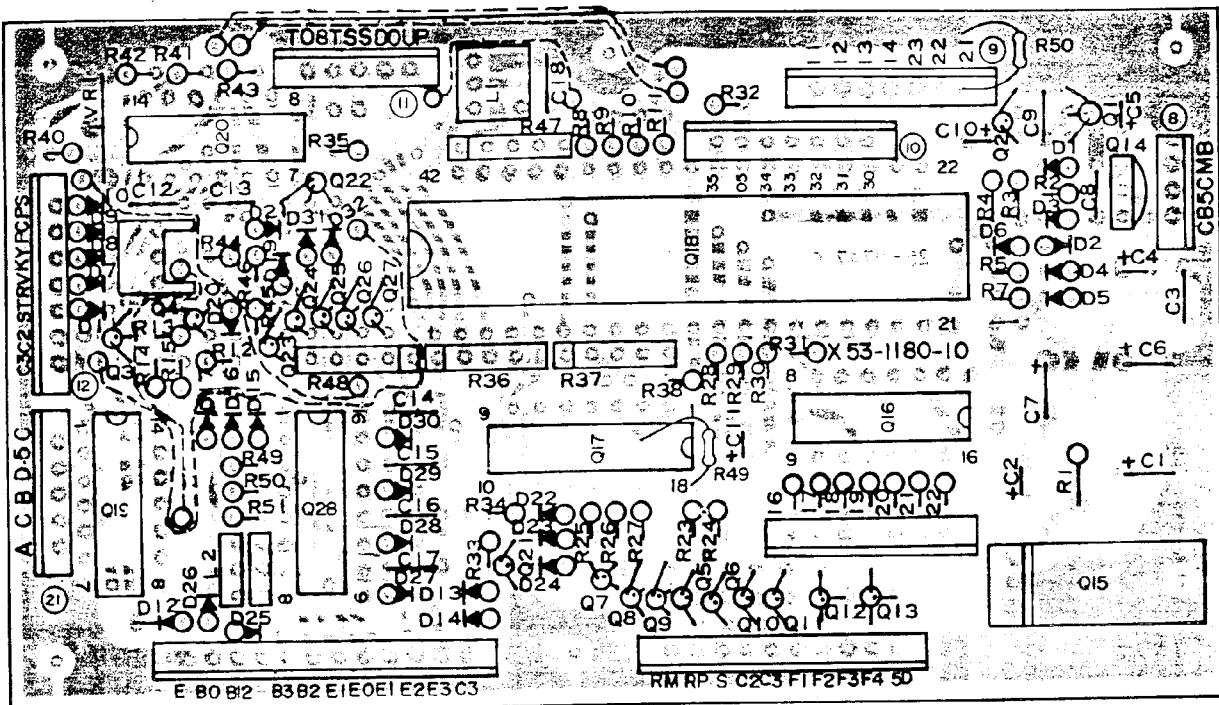
Q1 2SK19(GR) TRIO-5 Q2,13,2SC1923(O) Q3,9,3SK74(L) Q4,10~12:2SC460(B)  
Q5 2SK30(AGR) Q6,7 2SC2240(GR) Q8 2SC1775(E) Q14,TC5081P Q15 TC5082P-GL  
Q16 TC9122P D1 1SV50S D2,3,1S2588 D4,1SS16 D5 1S2208



# TR-7800

## PC BOARD VIEWS

▼ CONTROL UNIT (X53-1180-XX) XX: 10(K), 61(W)(T) Parts list: Page 17

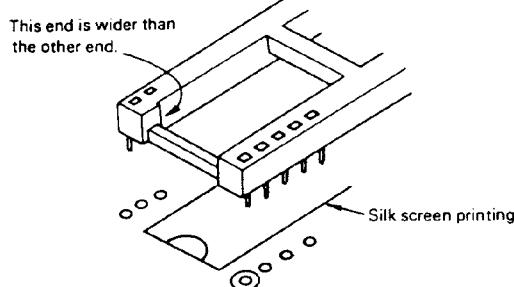


Q1~13,21~23 2SC2603(E) Q14 NJM78L06K Q15 FS7805C Q16 SN74LS247N  
Q17 MC14599B Q18 μPD650C-037 Q19,20 TC4001BP Q24~27 2SA1115(E) (K)  
Q28 MK5087N (K) D1 X2-060 D2~11,13~17,19~24 1S1555 D12,25,26 1N60  
D27~32 1S1555 (K) D33~36 1S1555 (W)

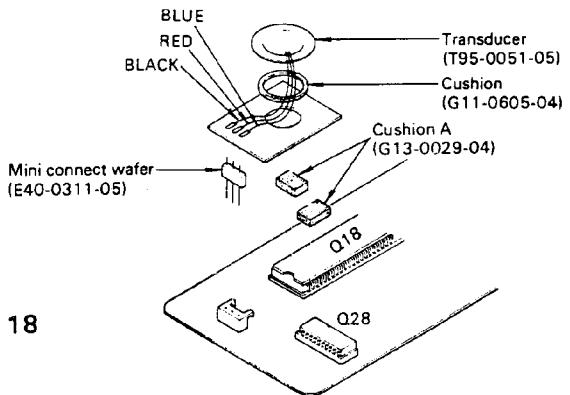
2SC2603(E)  
2SA1115(E)



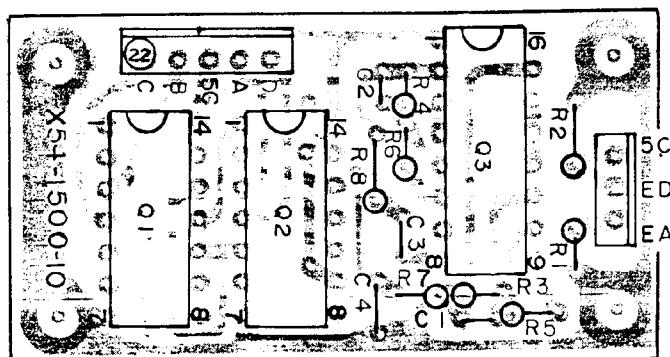
< Attachment direction of the IC socket >



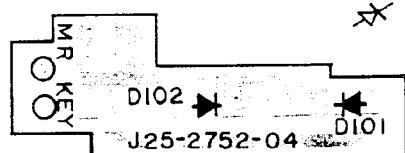
< Attachment method of the transducer >



▼ ENCODER UNIT (X54-1500-10) Parts list: Page 18



▼ LED (J25-2752-04)

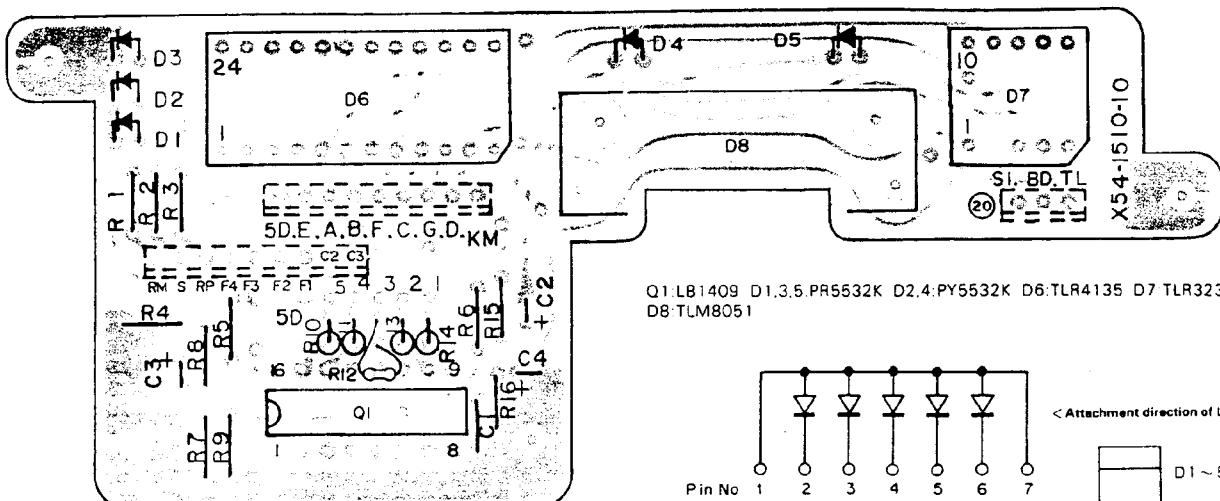


D101,102 AA5532T

Q1 TC4001BP Q2 TC4011BP Q3 TC4049BP

# PC BOARD VIEW / IC.LED DATA

► DISPLAY UNIT (X54-1510-10) Parts list: Page 18



Q1 LB1409 D1,3,5 PR5532K D2,4:PY5532K D6:TLR4135 D7 TLR323  
D8:TLM8051

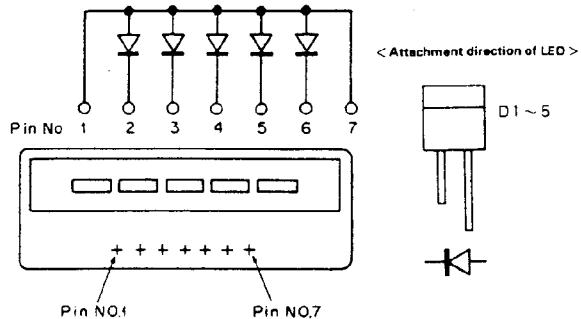


Fig. 14 TLM8051 (Display Unit D8)

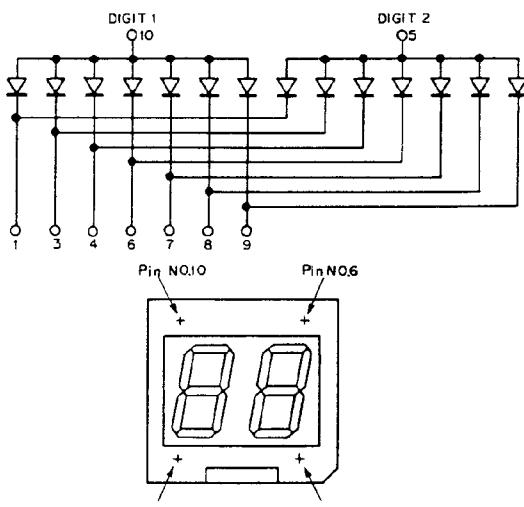


Fig. 15 TLR323 (Display Unit D7)

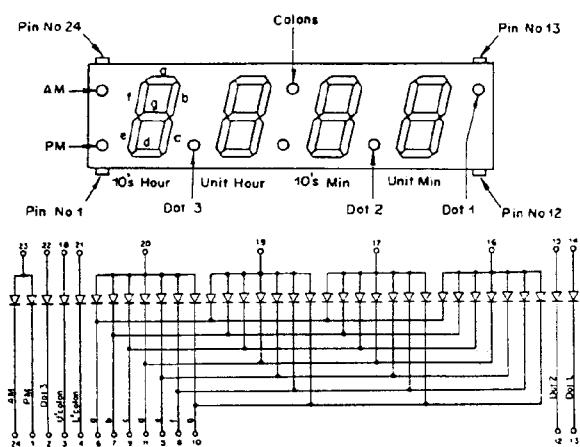


Fig. 13 TLR4135 (Display Unit D6)

## LB1409 (Display Unit Q1)

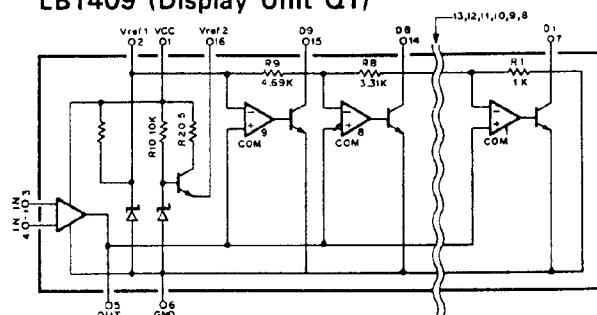
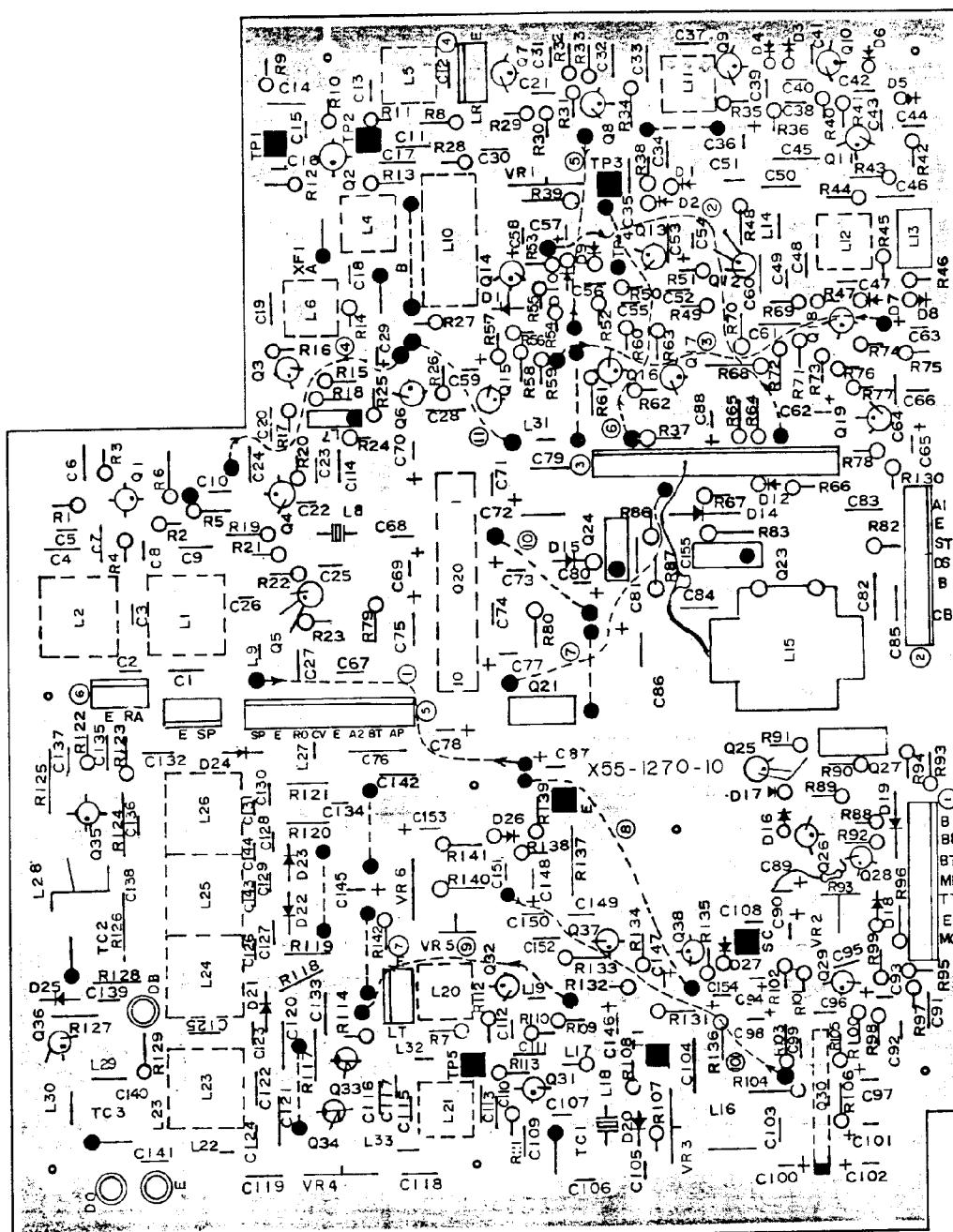


Fig. 16 Equivalent circuit

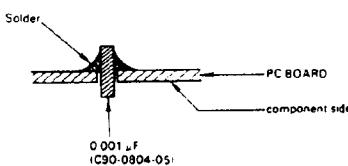
# TR-7800

## PC BOARD VIEW

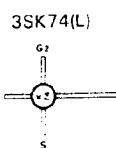
▼ RX UNIT (X55-1270-XX) XX: 10(K), 51(T), 61(W) Parts list: Page 18



< Attachment method of the C90-0804-05 >



Q1.2.35.3SK74(L) Q3~11.31.32.2SC460(B) Q12.13.2SC1775(E)  
 Q14~16.18.19.25.26.2SC1815(Y) Q17.28.2SA1015(Y) Q20.HA1366W  
 Q21.27.FS7808C Q23.2SA496(Y) Q24.2SC496(Y) Q29.2SC2240(GR)  
 Q30.TA7061AP Q33.34.2SK61(GR) Q36.2SC2538-22-A  
 Q37.38.2SC458(B)(W)(T)  
 D1.2.7~10.1N60 D3~6.12.14.16.25.1S1555 D11.1S1212 D15.XZ-088  
 D17.XZ-060 D18.XZ-070 D19.V06B D20.21.1S2208 D22~24.1TT410  
 D26.1S1555(W)(T) D27.1S1555(T)



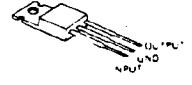
2SC460(B)  
2SC458(B)

2SA1015(Y)  
2SC1775(E)  
2SC1815(Y)  
2SC2240(GR)

HA1366W



FS7808C



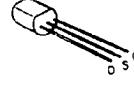
2SA496(Y)  
2SC496(Y)



TA7061AP



2SC2538



# PARTS LIST

Note 1:  
K: USA T: Britain W: Europe X: Australia

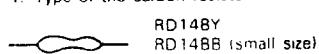
Note 2:  
Only special type of resistors (example: cement, metal film, etc.) and capacitors (example: electrolytic, tantalum, mylar, temp. coeff. capacitors) are detailed in the PARTS LIST. For the value of all common type components, refer to the schematic diagram of the P.C. board illustration. Resistors not otherwise detailed are carbon type (1/4W or 1/8W). Order carbon resistors and capacitors according to the following example.

A carbon resistor's part number is RD14BY 2E222J.

A ceramic capacitor's number is CK45F1H103Z, CC45TH1H220J.

## RESISTOR

### 1. Type of the carbon resistor



RD14CY  
RD14CB (small size)

### 2. Wattage

$$\begin{array}{lll} 1W \rightarrow 3A & 3W \rightarrow 3F & 5W \rightarrow 3H \\ 2W \rightarrow 3D & 4W \rightarrow 3G & \end{array}$$

3' = CC45 ○ ○ ...

Ceramic capacitor (type I) temperature coeff. capacitor 1' 3'

| 1st word<br>(Color) | C<br>(Black) | L<br>(Red) | P<br>(Orange) | R<br>(Yellow) | S<br>(Green) | T<br>(Blue) | U<br>(Violet) |
|---------------------|--------------|------------|---------------|---------------|--------------|-------------|---------------|
| pom/<br>C           | 0            | -80        | -150          | -220          | -330         | -470        | -750          |

3 = CK45 ○

Ceramic capacitor (type II) 3

| Cord                       | B          | D          | E          | F          |
|----------------------------|------------|------------|------------|------------|
| Operating temperature<br>C | -30<br>+85 | -30<br>+85 | -30<br>+85 | -10<br>+70 |

### 6 = Tolerance

| Cord | C     | D    | G  | J  | K   | M   | X          | Z          | P          | No cord                     |  |
|------|-------|------|----|----|-----|-----|------------|------------|------------|-----------------------------|--|
| (%)  | ±0.25 | ±0.5 | ±2 | ±5 | ±10 | ±20 | +40<br>-20 | +80<br>-20 | +100<br>-0 | More than 10 μF - 10 ~ + 50 |  |

Less than 10 pF

| Cord | B    | C     | D    | F  | G  |
|------|------|-------|------|----|----|
| (pF) | ±0.1 | ±0.25 | ±0.5 | ±1 | ±2 |

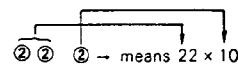
| Abbreviation | Abbreviation | Abbreviation | Abbreviation |
|--------------|--------------|--------------|--------------|
| Cap          | Capacitor    | ML           | Mylar        |
| C            | Ceramic      | S            | Styren       |
| E            | Electrolytic | T            | Tantalum     |
| MC           | Mica         |              |              |

## GENERAL

☆: New Parts

| Ref. No. | Parts No.   | Description                   | Re-marks |
|----------|-------------|-------------------------------|----------|
| -        | A01-0772-03 | Case (A) Upper                | ☆        |
| -        | A01-0773-03 | Case (B) Lower                | ☆        |
| -        | A13-0612-02 | Angle ass'y (right)           |          |
| -        | A13-0613-02 | Angle ass'y (left)            |          |
| -        | A13-0614-04 | Angle (top)                   | ☆        |
| -        | A20-2379-03 | Panel (K)                     |          |
| -        | A20-2380-03 | Panel (T)                     | ☆        |
| -        | A20-2381-03 | Panel (W)                     | ☆        |
| -        | B03-0516-04 | Switch mask x 6               | ☆        |
| -        | B05-0701-04 | Speaker grill cloth           |          |
| -        | B05-0713-04 | Grill cloth (Tone oscillator) |          |
| -        | B07-0625-04 | Side escutcheon x 2           | ☆        |

### 3. Resistance value

  
② ② → means  $22 \times 10^2 = 2200\Omega$  (2.2 kΩ)  
Example 221 → 220Ω    223 → 22 kΩ    225 → 2.2 MΩ  
222 → 2.2 kΩ    224 → 220 kΩ

### 4. Tolerance

J = ±5% (Gold)    K = ±10% (Silver)

## CAPACITORS

### Type I

CC 45 TH 1H 220 J CK 45 F 1H 103 Z

1 = Type    2 = Shape    3 = Temp range    4 = Voltage rating

1' = Ceramic, electrolytic, etc    2' = Round, square, etc    3' = Temp coefficient

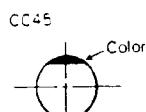
4 = Value    5 = Tolerance    6 = Tolerance

Ex: CC45TH = -470 ±60 ppm/°C

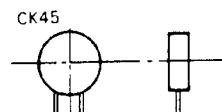
| 2nd Word | G   | H   | J    | K    | L    |
|----------|-----|-----|------|------|------|
| pom/ C   | ±30 | ±60 | ±120 | ±250 | ±500 |

### 5 = Capacitor value

Example: 010 → 1 pF  
100 → 10 pF  
101 → 100 pF  
102 → 1000 pF = 0.001 μF  
103 → 0.01 μF



Type I



Type II

| Ref. No. | Parts No.   | Description                     | Re-marks |
|----------|-------------|---------------------------------|----------|
| -        | B07-0626-03 | Front escutcheon                | ☆        |
| -        | B10-0628-14 | Front glass                     | ☆        |
| -        | B42-1685-04 | Switch plate (H/L)              | ☆        |
| -        | B46-0058-00 | Warranty card (K)               |          |
| -        | B50-2727-00 | Operating manual (K)            | ☆        |
| -        | B50-2728-00 | Operating manual (T)            | ☆        |
| -        | B50-2729-00 | Operating manual (W)            | ☆        |
| -        | E06-0651-05 | 6P Metal socket (MIC)           |          |
| -        | E07-0252-05 | 2P Metal Socket (DC cord ass'y) |          |
| -        | E12-0001-05 | Earphone plug                   |          |
| -        | E29-0412-05 | 1P Connector (male)             |          |
| -        | E29-0413-05 | 1P Connector (female)           |          |
| -        | E30-1674-05 | DC cord ass'y                   |          |

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8 Cherry Tree Rd, Chinnor

Oxon OX9 4QY

Tel: 01844-351694 Fax: 01844-352554

Email: enquiries@mauritron.co.uk

## PARTS LIST

| Ref. No. | Parts No.   | Description                     | Remarks |
|----------|-------------|---------------------------------|---------|
| —        | E31-0456-05 | Plug with lead (SP)             |         |
| —        | F05-8021-05 | Fuse (8A)                       |         |
| —        | G02-0505-05 | Knob spring AF                  |         |
| —        | G09-0411-05 | Knob spring SQL                 | ☆       |
| —        | G13-0628-04 | Cushion (battery)               | ☆       |
| —        | G53-0511-04 | Packing x 8 (case)              | ☆       |
| —        | H01-2683-03 | Carton case (inside) (K) (W)    | ☆       |
| —        | H01-2684-03 | Carton case (inside) (T)        | ☆       |
| —        | H10-2501-03 | Styrene foam cushion (upper)    |         |
| —        | H10-2534-02 | Styrene foam cushion (lower)    | ☆       |
| —        | H25-0049-03 | Accessories bag                 |         |
| —        | H25-0079-04 | Protective bag (MIC)            |         |
| —        | H25-0103-04 | Protective bag (cord)           |         |
| —        | H25-0106-04 | Protective bag                  |         |
| —        | J02-0069-05 | Foot x 2 (small, Rear)          |         |
| —        | J02-0070-05 | Foot x 2 (large, Front)         |         |
| —        | J19-1334-05 | Battery case                    | ☆       |
| —        | J21-0392-04 | Lead holder                     |         |
| —        | J21-2504-04 | Speaker mounting plate          |         |
| —        | J31-0514-04 | Spacer collar H/L               |         |
| —        | J32-0745-04 | Round boss x 5                  | ☆       |
| —        | J32-0746-04 | Hex. boss                       | ☆       |
| —        | J42-0409-04 | Knob bush H/L                   |         |
| —        | J61-0019-05 | Viny letie x 2                  |         |
| —        | K21-0751-03 | Main knob                       | ☆       |
| —        | K23-0734-04 | Knob (AF)                       | ☆       |
| —        | K23-0735-04 | Knob (SQL)                      | ☆       |
| —        | K27-0414-04 | Push knob x 5                   | ☆       |
| —        | K27-0415-04 | Push knob (KEY, M. SEL)         | ☆       |
| —        | K29-0734-04 | Push knob HI/LOW                | ☆       |
| —        | N09-0008-04 | Screw x 4 (angle)               |         |
| —        | N09-0256-05 | Ground screw                    |         |
| —        | N09-0619-05 | Plastic screw x 2 (battery)     | ☆       |
| —        | N14-0508-04 | Spanner nut                     |         |
| —        | N14-0510-04 | Flange nut x 4 (angle)          |         |
| —        | N14-0516-05 | Speed nut x 2                   |         |
| —        | N15-1040-46 | Flat washer x 4 (angle)         |         |
| —        | N15-1060-41 | Flat washer x 4 (angle)         |         |
| —        | N16-0060-41 | Spring washer x 4 (angle)       |         |
| —        | N30-3006-46 | Screw x 2                       |         |
| —        | N30-3008-11 | Screw x 2                       |         |
| —        | N33-3006-45 | Round flat screw (case, etc.)   |         |
| —        | N99-0304-04 | Allen head bolt x 4 (angle)     |         |
| —        | R19-9404-05 | Pot. 50kΩ (B), 10kΩ (K)         | ☆       |
| —        | S40-2403-05 | Push switch H/L                 |         |
| —        | S40-2415-05 | Push switch (K, T) x 5, (W) x 4 | ☆       |
| —        | S40-2416-05 | Push switch (K, T) x 1, (W) x 2 | ☆       |
| —        | S59-0406-05 | Key board ass'y                 | ☆       |
| —        | T03-0027-15 | Speaker                         |         |
| —        | T91-0311-05 | Microphone (TRIO) (T)           |         |
| —        | T91-0313-05 | Microphone (KENWOOD) (K) (W)    |         |

| Ref. No. | Parts No.   | Description          | Remarks |
|----------|-------------|----------------------|---------|
| D101,102 | V30-1170-06 | LED AA5532T          | ☆       |
| —        | W01-0401-04 | Allen key            |         |
| —        | W02-0315-05 | Rotary encoder       | ☆       |
| —        | X45-1150-10 | Final unit           | ☆       |
| —        | X50-1650-10 | PLL unit             | ☆       |
| —        | X53-1180-10 | Control unit (K)     | ☆       |
| —        | X53-1180-61 | Control unit (W) (T) | ☆       |
| —        | X54-1500-10 | Encoder unit         | ☆       |
| —        | X54-1510-10 | Display unit         | ☆       |
| —        | X55-1270-10 | RX unit (K)          | ☆       |
| —        | X55-1270-51 | PX unit (T)          | ☆       |
| —        | X55-1270-61 | RX unit (W)          | ☆       |

## FINAL UNIT (X45-1150-10)

| Ref. No. | Parts No.    | Description               | Remarks         |
|----------|--------------|---------------------------|-----------------|
| C2       | CE04W1C221Q  | E      220μF      16V     |                 |
| C4       | CE04W1C101Q  | E      100μF      16V     |                 |
| C5       | CC45SL2H070D | C      7pF      ±0.5pF    |                 |
| C6       | CC45SL2H080D | C      8pF      ±0.5pF    |                 |
| C7       | CC45SL2H101J | C      100pF      ±5%     |                 |
| C10      | CC45CH1H330J | C      33pF      ±5%      |                 |
| C11      | CC45SL2H101J | C      100pF      ±5%     |                 |
| C12      | CC45SL2H330J | C      33pF      ±5%      |                 |
| C13      | CC45CH1H0R5C | C      0.5pF      ±0.25pF |                 |
| C15      | CC45SL2H390J | C      39pF      ±5%      |                 |
| C16      | CC45SL2H100D | C      10pF      ±0.5pF   |                 |
| C17      | CC45SL2H020C | C      2pF      ±0.25pF   |                 |
| C19      | CC45SL2H220J | C      22pF      ±5%      |                 |
| C23      | CS15E1VR47M  | T      0.47μF      35V    |                 |
| C25      | CS15E1C4R7M  | T      4.7μF      16V     |                 |
| C28      | CC45SL2H120J | C      12pF      ±5%      |                 |
| —        | E04-0102-05  | UHF type receptacle       |                 |
| —        | E06-0252-05  | 2P Metal socket           |                 |
| —        | E08-0304-05  | Power jack (BACK UP)      |                 |
| —        | E11-0403-05  | Earphone jack             |                 |
| —        | E23-0046-04  | Square terminal x 7       |                 |
| —        | E23-0401-05  | Round terminal x 3        |                 |
| —        | E40-0473-05  | Mini connect wafer 4P     |                 |
| —        | E40-0573-05  | Mini connect wafer 5p     |                 |
| —        | F01-0747-05  | Heat sink                 |                 |
| —        | F20-0078-05  | MICA insulator (Q5)       |                 |
| —        | F29-0014-05  | Shoulder washer (Q5)      | ☆               |
| L1       | L34-0823-05  | VHF coil                  | 5Φ3T            |
| L2       | L34-0438-05  | Coil                      | 0.9μH           |
| L3       | L34-0692-05  | VHF coil                  | 5Φ4T            |
| L4       | L34-0817-05  | VHF coil                  | 5Φ3T            |
| L5       | L34-0823-05  | VHF coil                  | 5Φ3T            |
| L6       | L40-1511-03  | Ferric-inductor           | 150μH           |
| L7,8     | L33-0025-05  | Choke coil                | 1μH             |
| L9       | L34-0887-05  | VHF coil                  | 5Φ3T            |
| VR1      | R12-5024-05  | Trim. pot                 | 100kΩ (2 poles) |

## PARTS LIST

| Ref. No. | Parts No.   | Description      |             | Re-marks | Ref. No. | Parts No.    | Description        |             | Re-marks |
|----------|-------------|------------------|-------------|----------|----------|--------------|--------------------|-------------|----------|
| VR2      | R12-0048-05 | Trim. pot        | 100Ω        |          | C63      | C91-0457-05  | C 0.022μF          | ±10%        |          |
| VR3      | R12-4016-05 | Trim. pot        | 50kΩ        |          | C65      | CC45UJ1H070D | C 7pF              | ±0.5pF      |          |
| VR4      | R12-0042-05 | Trim. pot        | 500Ω        |          | TC1      | C05-0062-05  | Ceramic timer      | 6pF         |          |
| —        | R92-0150-05 | Short jumper x 2 |             |          | TC2      | C05-0031-15  | Ceramic timer      | 10pF        |          |
| RL1      | S51-1404-05 | Relay            |             |          | —        | E23-0046-04  | Square terminal    | x 3         |          |
| Q1~3     | V03-1815-06 | TR               | 2SC1815 (Y) |          | —        | E40-0273-05  | Mini connect wafer | 2P          |          |
| Q4       | V01-0113-05 | TR               | 2SA496 (Y)  |          | —        | E40-0473-05  | Mini connect wafer | 4P          |          |
| Q5       | V04-0880-16 | TR               | 2SD880 (Y)  |          | —        | E40-0673-05  | Mini connect wafer | 6P          |          |
| Q6       | V30-1171-60 | Power module     | M57733      | ☆        | —        | E40-0773-05  | Mini connect wafer | 7P          |          |
| D1       | V11-5260-16 | Diode            | MI402       |          | L1       | L40-3391-03  | Ferri-inductor     | 3.3μH       |          |
| D2       | V11-0255-05 | Diode            | MI301       |          | L2       | L32-0624-05  | Oscillating coil   | VCO         |          |
| D3,4     | V11-0051-05 | Diode            | IN60        |          | L3       | L40-3391-03  | Ferri-inductor     | 3.3μH       |          |
| D5       | V11-4104-20 | Zener diode      | XZ-064      |          | L4       | L34-0820-05  | Tuning coil        |             |          |
| D6       | V11-5460-26 | Diode            | U15B        |          | L5,6     | L34-0901-05  | Tuning coil        |             |          |
| D7       | V11-0076-05 | Diode            | 1S1555      | ☆        | L7       | L33-0631-05  | Choke coil         | 4.7μH ±5%   |          |
|          |             |                  |             |          | L8,9     | L40-1021-03  | Ferri-inductor     | 1mH         |          |
|          |             |                  |             |          | L10      | L40-4711-03  | Ferri-inductor     | 470μH       |          |
|          |             |                  |             |          | L11      | L34-0683-05  | Tuning coil        |             |          |
|          |             |                  |             |          | L12,13   | L40-1021-03  | Ferri-inductor     | 1mH         |          |
|          |             |                  |             |          | L14      | L40-1501-03  | Ferri-inductor     | 15μH        |          |
|          |             |                  |             |          | L15      | L77-0855-05  | Crystal            | 14.2005 MHz |          |
|          |             |                  |             |          | L16      | L40-4711-03  | Ferri-inductor     | 470μH       |          |

## PLL UNIT (X50-1650-10)

| Ref. No. | Parts No.    | Description |         | Re-marks | Ref. No. | Parts No.   | Description      |                   | Re-marks |
|----------|--------------|-------------|---------|----------|----------|-------------|------------------|-------------------|----------|
| C1       | CC45PG1H080D | C           | 8pF     | ±0.5pF   | VR1      | R12-4020-05 | Trim. pot        | 50kΩ              |          |
| C2       | CC45CH1H060D | C           | 6pF     | ±0.5pF   | —        | R92-0150-05 | Short jumper x 3 |                   |          |
| C3       | CC45CH1H0R5C | C           | 0.5pF   | ±0.25pF  | Q1       | V09-1001-16 | FET              | 2SK19 (GR) TR10-5 |          |
| C4       | CC45CH1H060D | C           | 6pF     | ±0.5pF   | Q2       | V03-1923-06 | TR               | 2SC1923 (O)       |          |
| C5       | CC45CH1H150J | C           | 15pF    | ±5%      | Q3       | V09-1002-56 | FET              | 3SK74 (L)         |          |
| C6       | CC45CH1H030C | C           | 3pF     | ±0.25pF  | Q4       | V03-0079-05 | TR               | 2SC460 (B)        |          |
| C7       | CE04W1A101Q  | E           | 100μF   | 10V      | Q5       | V09-0060-05 | FET              | 2SK30A (GR)       |          |
| C9       | CC45CH1H040C | C           | 4pF     | ±0.25pF  | Q6,7     | V03-2240-06 | TR               | 2SC2240 (GR)      |          |
| C11      | CC45CH1H020C | C           | 2pF     | ±0.25pF  | Q8       | V03-1775-06 | TR               | 2SC1775 (E)       |          |
| C12      | CC45CH1H220J | C           | 22pF    | ±5%      | Q9       | V09-1002-56 | FET              | 3SK74 (L)         |          |
| C15      | CE04W1C100Q  | E           | 10μF    | 16V      | Q10~12   | V03-0079-05 | TR               | 2SC460 (B)        |          |
| C16      | C91-0457-05  | C           | 0.022μF | ±10%     | Q13      | V03-1923-06 | TR               | 2SC1923 (O)       |          |
| C18      | CC45CH1H030C | C           | 3pF     | ±0.25pF  | Q14      | V30-1132-06 | IC               | TC5081P           |          |
| C19      | CC45CH1H0R5C | C           | 0.5pF   | ±0.25pF  | Q15      | V30-1133-06 | IC               | TC5082P-GL        |          |
| C21      | CC45CH1H220J | C           | 22pF    | ±5%      | Q16      | V30-1036-16 | IC               | TC9122P           |          |
| C23      | CE04W1A470Q  | E           | 47μF    | 10V      | D1       | V11-1260-36 | Vari-cap diode   | 1SV50S            |          |
| C24,25   | CC45CH1H101J | C           | 100pF   | ±5%      | D2,3     | V11-0414-05 | Diode            | 1S2588            |          |
| C27      | CC45UJ1H180J | C           | 18pF    | ±5%      | D4       | V11-0374-05 | Diode            | 1SS16             |          |
| C28      | CC45UJ1H100D | C           | 10pF    | ±0.5pF   | D5       | V11-0317-05 | Vari-cap diode   | 1S2208            |          |
| C29      | CC45UJ1H390J | C           | 39pF    | ±5%      |          |             |                  |                   |          |
| C31      | CS15E1VR47M  | T           | 0.47μF  | 35V      |          |             |                  |                   |          |
| C34      | CE04W1A101Q  | E           | 100μF   | 10V      |          |             |                  |                   |          |
| C35      | C91-0131-05  | C           | 0.01μF  | ±10%     |          |             |                  |                   |          |
| C36      | CQ92M1H473K  | ML          | 0.047μF | ±10%     |          |             |                  |                   |          |
| C38      | CS15E1C4R7M  | T           | 4.7μF   | 16V      |          |             |                  |                   |          |
| C39      | CS15E1C2R2M  | T           | 2.2μF   | 16V      |          |             |                  |                   |          |
| C40      | CQ92M1H223K  | ML          | 0.022μF | ±10%     |          |             |                  |                   |          |
| C41      | CE04W1E4R7Q  | E           | 4.7μF   | 25V      |          |             |                  |                   |          |
| C43      | CE04W1H010Q  | E           | 1μF     | 50V      |          |             |                  |                   |          |
| C44      | CE04W1A101Q  | E           | 100μF   | 10V      |          |             |                  |                   |          |
| C48      | CC45CH1H030C | C           | 3pF     | ±0.25pF  |          |             |                  |                   |          |
| C49      | CC45SL1H101J | C           | 100pF   | ±5%      |          |             |                  |                   |          |
| C50      | CE04W1A470Q  | E           | 47μF    | 10V      |          |             |                  |                   |          |
| C52      | CQ92M1H223K  | ML          | 0.022μF | ±10%     |          |             |                  |                   |          |
| C53      | CC45SL1H101J | C           | 100pF   | ±5%      |          |             |                  |                   |          |
| C54,55   | CC45CH1H100D | C           | 10pF    | ±0.5pF   |          |             |                  |                   |          |
| C56      | CE04W1A101Q  | E           | 100μF   | 10V      |          |             |                  |                   |          |

CONTROL UNIT (X53-1180-XX)  
XX: 10(K), 61(W)(T)

| Ref. No. | Parts No.   | Description |         | Re-marks |
|----------|-------------|-------------|---------|----------|
| C1       | CE04W1C331Q | E           | 330μF   | 16V      |
| C2       | CE04W1A101Q | E           | 100μF   | 10V      |
| C4       | CE04W1C470Q | E           | 47μF    | 16V      |
| C5       | CE04W1A470Q | E           | 47μF    | 10V      |
| C6,7     | CE04W1A471Q | E           | 470μF   | 10V      |
| C10      | CE04W1H010Q | E           | 1μF     | 50V      |
| C11      | CE04W1A101Q | E           | 100μF   | 10V      |
| C12,13   | CQ92M1H393K | ML          | 0.039μF | ±10%     |
| C18      | CQ92M1H223K | ML          | 0.022μF | ±10%     |

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# TR-7800

## PARTS LIST

| Ref No. | Parts No.    | Description                                 | Re-marks |
|---------|--------------|---|----------|
| —       | E02-0103-05  | IC Socket 16P (K)                           |          |
| —       | E02-0106-05  | IC Socket 42P                               |          |
| —       | E40-0311-05  | Mini connect wafer 3P                       |          |
| —       | E40-0373-05  | Mini connect wafer 3P                       |          |
| —       | E40-0573-05  | Mini connect wafer 5P                       |          |
| —       | E40-0773-05  | Mini connect wafer 7P                       |          |
| —       | E40-1073-05  | Mini connect wafer 10P                      |          |
| —       | E40-1273-05  | Mini connect wafer 12P                      |          |
| —       | G11-0605-04  | Cushion (Transducer)                        |          |
| —       | G13-0629-04  | Cushion (A) (Transducer)<br>(K) x 2 (W) x 1 | ☆        |
| —       | G13-0630-04  | Cushion (B) (Transducer) (W)                | ☆        |
| L1      | L30-0503-05  | IFT   |          |
| L2      | L78-0003-05  | Ceramic oscillator 3.58MHz (K)              |          |
| R1      | RS14AB3A330J | Metal film $330\pm5\%1W$                    |          |
| R36     | R90-0526-05  | Resistor block $27k\Omega \times 4$         |          |
| R37     | R90-0530-05  | Resistor block $2.7k\Omega \times 4$        | ☆        |
| R47     | R90-0529-05  | Resistor block $100k\Omega \times 4$        | ☆        |
| R48     | R90-0526-05  | Resistor block $27k\Omega \times 4$ (K)     | ☆        |
| VR1     | R12-2015-05  | Trim.pot 5kΩ (K)                            |          |
| BZ1     | T95-0051-05  | Transducer                                  |          |
| Q1~13   | V03-2803-06  | TR 2SC2603 (E)                              |          |
| Q14     | V30-1067-06  | IC NJM78L06K                                |          |
| Q15     | V30-1165-06  | IC FS7805C                                  |          |
| Q16     | V30-1030-56  | IC SN74LS247N                               |          |
| Q17     | V30-1166-06  | IC MC14599B                                 |          |
| Q18     | V30-1164-06  | IC $\mu$ PD650C-037                         |          |
| Q19,20  | V30-1066-06  | IC TC4001BP                                 |          |
| Q21~23  | V03-2603-06  | TR 2SC2603 (E)                              |          |
| Q24~27  | V01-1115-16  | TR 2SA1115 (E) (K)                          |          |
| Q28     | V30-1074-06  | IC MK5087N (K)                              |          |
| D1      | V11-4101-20  | Zener diode XZ-060                          |          |
| D2~11   | V11-0076-05  | Diode 1S1555                                |          |
| D12     | V11-0051-05  | Diode 1N60                                  |          |
| D13~17  | V11-0076-05  | Diode 1S1555                                |          |
| D18     |              | not used                                    |          |
| D19~24  | V11-0076-05  | Diode 1S1555                                |          |
| D25,26  | V11-0051-05  | Diode 1N60                                  |          |
| D27~32  | V11-0076-05  | Diode 1S1555 (K)                            |          |
| D33~36  | V11-0076-05  | Diode 1S1555 (W, T)                         |          |

## ENCODER UNIT (X54-1500-10)

| Ref. No. | Parts No.    | Description           | Re-marks |
|----------|--------------|-----------------------|----------|
| C1~4     | CC45SL1H101J | C $100pF \pm 5\%$     |          |
| —        | E40-0373-05  | Mini connect wafer 3P |          |
| —        | E40-0573-05  | Mini connect wafer 5P |          |

| Ref. No. | Parts No.   | Description | Re-marks |
|----------|-------------|-------------|----------|
| Q1       | V30-1066-06 | IC TC4001BP |          |
| Q2       | V30-0301-70 | IC TC4011BP |          |
| Q3       | V30-1009-26 | IC TC4049BP |          |

## DISPLAY UNIT (X54-1510-10)

| Ref. No. | Parts No.   | Description           | Re-marks |
|----------|-------------|-----------------------|----------|
| C2       | CS15E1C010M | T $1\mu F$ 16V        |          |
| C3       | CS15E1C4R7M | T $4.7\mu F$ 16V      |          |
| C4       | CS15E1V0R1M | T $0.1\mu F$ 35V      |          |
| —        | E40-0373-05 | Mini connect wafer 3P |          |
| —        | E40-0973-05 | Mini connect wafer 9P |          |
| —        | N09-0625-04 | Screw M2.5 x 6        | ☆        |
| —        | N14-0520-04 | Nut M2.5              | ☆        |
| D1       | V11-7272-36 | LED PR5532K           |          |
| D2       | V11-7272-46 | LED PY5532K           |          |
| D3       | V11-7272-36 | LED PR5532K           |          |
| D4       | V11-7272-46 | LED PY5532K           |          |
| D5       | V11-7272-36 | LED PR5532K           |          |
| D6       | V11-3173-06 | LED TLR4135           |          |
| D7       | V11-3172-96 | LED TLR323            | ☆        |
| D8       | V11-3173-16 | LED block TLM8051     | ☆        |
| Q1       | V30-1163-06 | IC LB1409             | ☆        |

## RX UNIT (X55-1270-XX) XX: 10(K), 51(T), 61(W)

| Ref. No. | Parts No.    | Description               | Re-marks |
|----------|--------------|---------------------------|----------|
| C1       | CC45RH1H120J | C $12pF \pm 5\%$          |          |
| C2       | CC45CH1H330J | C $33pF \pm 5\%$          |          |
| C3       | CC45CH1H030C | C $3pF \pm 0.25pF$        |          |
| C4       | CC45CH1H220J | C $22pF \pm 5\%$          |          |
| C5       | CC45RH1H100D | C $10pF \pm 0.5pF$        |          |
| C12      | CC45CH1H330J | C $33pF \pm 5\%$          |          |
| C13      | CC45CH1H020C | C $2pF \pm 0.25pF$        |          |
| C14      | CC45CH1H150J | C $15pF \pm 5\%$          |          |
| C15      | CC45CH1H0R5C | C $0.5pF \pm 0.25pF$      |          |
| C18      | CC45CH1H050C | C $5pF \pm 0.25pF$        |          |
| C19      | CC45CH1H680J | C $68pF \pm 5\%$          |          |
| C20      | CQ92M1H223K  | ML $0.022\mu F \pm 10\%$  |          |
| C21      | CQ92M1H103K  | ML $0.01\mu F \pm 10\%$   |          |
| C23      | CC45SL1H151J | C $150pF \pm 5\%$         |          |
| C25      | CC45CH1H220J | C $22pF \pm 5\%$          |          |
| C26      | CE04W1A470Q  | E $47\mu F$ 10V           |          |
| C28      | CQ92M1H223K  | ML $0.022\mu F \pm 10\%$  |          |
| C29      | CE04W1A470Q  | E $47\mu F$ 10V           |          |
| C32,33   | CQ92M1H223K  | ML $0.022\mu F \pm 10\%$  |          |
| C36      | CE04W1A101Q  | E $100\mu F$ 10V          |          |
| C37      | CQ92M1H223K  | ML $0.022\mu F \pm 10\%$  |          |
| C38      | CC45SL1H470J | C $47pF \pm 5\%$          |          |
| C41      | CQ92M1H222K  | ML $0.0022\mu F \pm 10\%$ |          |
| C44      | CQ92M1H222K  | ML $0.0022\mu F \pm 10\%$ |          |
| C45      | CQ92M1H473K  | ML $0.047\mu F \pm 10\%$  |          |
| C46      | CQ92M1H223K  | ML $0.022\mu F \pm 10\%$  |          |

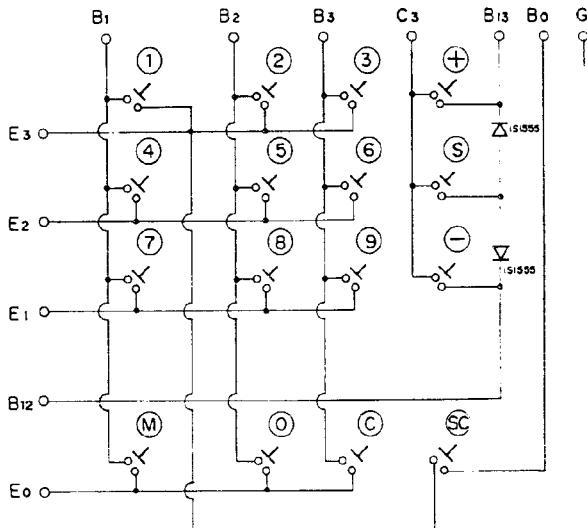
# PARTS LIST

| Ref. No. | Parts No.    | Description         | Re-marks | Ref. No. | Parts No.   | Description                     | Re-marks |
|----------|--------------|---------------------|----------|----------|-------------|---------------------------------|----------|
| C47      | CQ92M1H102K  | ML 0.001μF ±10%     |          | C145     | CE04W1A470Q | E 47μF 10V                      |          |
| C48      | CQ92M1H332K  | ML 0.0033μF ±10%    |          | C146.147 | CE04W1C220Q | E 22μF 16V (W) (T)              |          |
| C49      | CQ92M1H222K  | ML 0.0022μF ±10%    |          | C148     | CE04W1H010Q | E 1μF 50V (W) (T)               |          |
| C50      | CQ92M1H393K  | ML 0.039μF ±10%     |          | C149.150 | C91-0433-05 | Laminated cap. 0.0039μF (W) (T) |          |
| C51      | CQ92M1H222K  | ML 0.0022μF ±10%    |          | C151     | CQ92M1H472K | ML 0.0047μF ±10% (W) (T)        |          |
| C52      | CQ92M1H103K  | ML 0.01μF ±10%      |          | C152     | C91-0433-05 | Laminated cap. 0.0039μF (W) (T) |          |
| C53      | CQ92M1H393K  | ML 0.039μF ±10%     |          | C153.154 | CS15E1A150K | T 15μF 10V (T)                  |          |
| C54      | CS15E1V0R1M  | T 0.1μF 35V         |          | TC1      | C05-0062-05 | Ceramic Trimmer 6PF             |          |
| C55      | CC45SL1H220J | C 22pF ±5%          |          | TC2      | C05-0030-15 | Ceramic Trimmer 20PF            |          |
| C56      | CQ92M1H222K  | ML 0.0022μF ±10%    |          | TC3      | C05-0031-15 | Ceramic Trimmer 10PF            |          |
| C57.58   | CS15E1A3R3M  | T 3.3μF 10V         |          | —        | E23-0046-04 | Square terminal x 7             |          |
| C59      | CS15E1C4R7M  | T 4.7μF 16V         |          | —        | E23-0401-05 | Round terminal x 3              |          |
| C60      | CQ92M1H223K  | ML 0.022μF ±10%     |          | —        | E40-0273-05 | Mini connect wafer 2P           |          |
| C61      | CQ92M1H473K  | ML 0.047μF ±10%     |          | —        | E40-0773-05 | Mini connect wafer 7P           |          |
| C62      | CE04W1C220Q  | E 22μF 16V          |          | —        | E40-0873-05 | Mini connect wafer 8P           |          |
| C63      | CE04W1C100Q  | E 10μF 16V          |          | —        | E40-1273-05 | Mini connect wafer 12P          |          |
| C64      | CQ92M1H103K  | ML 0.01μF ±10%      |          | —        | J31-0502-04 | PC Board collar x 6             |          |
| C65      | CS15E1V0R1M  | T 0.1μF 35V         |          | —        | J42-0404-05 | PC Board bush x 6               |          |
| C66      | CQ92M1H332K  | ML 0.0033μF ±10%    |          | L1.2     | L31-0267-05 | Tuning coil                     |          |
| C67      | CC45SL1H101J | C 100pF ±5%         |          | L3       | L79-0452-05 | Helical block 2 MHz (W)(T)      |          |
| C68      | CQ92M1H332K  | ML 0.0033μF ±10%    |          | L3       | L79-0461-05 | Helical block 5 MHz (K)         |          |
| C69      | CE04W1H010Q  | E 1μF 50V           |          | L4       | L30-0289-05 | IFT                             |          |
| C70      | CE04W1A101Q  | E 100μF 10V         |          | L5       | L34-0683-05 | Tuning coil                     |          |
| C72      | C90-0820-05  | E 470μF 16V (small) |          | L6       | L30-0289-05 | IFT                             |          |
| C73      | CE04W1A470Q  | E 47μF 10V          |          | L7       | L72-0014-05 | Ceramic filter SFE 10.7 MAS     |          |
| C74      | CC45SL1H101J | C 100pF ±5%         |          | L8       | L77-0858-05 | Crystal 10.240 MHz              |          |
| C75      | CE04W1A101Q  | E 100μF 10V         |          | L9       | L40-1511-03 | Ferri-inductor 150μH            |          |
| C76      | CQ92M1H104K  | ML 0.1μF ±10%       |          | L10      | L72-0315-05 | Ceramic filter CFW455F          |          |
| C77      | CE04W1H010Q  | E 1μF 50V           |          | L11      | L30-0504-05 | IFT                             |          |
| C78      | CE04W1A101Q  | E 100μF 10V         |          | L12      | L30-0503-05 | IFT                             |          |
| C80      | CE04W1C220Q  | E 22μF 16V          |          | L13      | L79-0446-05 | Ceramic discr CFY455S           |          |
| C86      | C90-0820-05  | E 470μF 16V (small) |          | L14      | L40-6825-04 | Ferri-inductor 6.8 mH           |          |
| C87.88   | CE04W1A470Q  | E 47μF 10V          |          | L15      | L15-0016-05 | Choke trans.                    |          |
| C89      | CE04W1C470Q  | E 47μF 16V          |          | L16      | L40-1541-27 | Ferri-inductor 150mH            |          |
| C90      | CE04W1A470Q  | E 47μF 10V          |          | L17      | L33-0615-05 | Choke coil                      |          |
| C93      | CS15E1C010M  | T 1μF 16V           |          | L18      | L77-0859-05 | Crystal 10.695 MHz              |          |
| C94      | CE04W1E4R7Q  | E 4.7μF 25V         |          | L19      | L40-1021-03 | Ferri-inductor 1 mH             |          |
| C95      | CQ92M1H682K  | ML 0.0068μF ±10%    |          | L20      | L30-0005-05 | IFT                             |          |
| C96      | CQ92M1H472K  | ML 0.0047μF ±10%    |          | L21      | L31-0313-05 | Tuning coil                     |          |
| C97      | CE04W1C220Q  | E 22μF 16V          |          | L22      | L40-1001-03 | Ferri-inductor 10μH             |          |
| C98      | CE04W1A470Q  | E 47μF 10V          |          | L23      | L34-0886-05 | Tuning coil                     |          |
| C100     | CE04W1H010Q  | E 1μF 50V           |          | L24      | L31-0180-05 | Tuning coil                     |          |
| C101     | CE04W1E4R7Q  | E 4.7μF 25V         |          | L25      | L31-0266-05 | Tuning coil                     |          |
| C102     | CE04W1A470Q  | E 47μF 10V          |          | L26      | L31-0267-05 | Tuning coil                     |          |
| C103     | CQ92M1H103K  | ML 0.01μF ±10%      |          | L27      | L40-1511-03 | Ferri-inductor 150μH            |          |
| C104     | CQ92M1H393K  | ML 0.039μF ±10%     |          | L28      | L34-0902-05 | VHF coil 5φ5T                   |          |
| C106     | CC45TH1H080D | C 8pF ±0.5pF        |          | L29      | L34-0452-05 | VHF coil 3φ6T                   |          |
| C107     | CC45UJ1H010C | C 1pF ±0.25pF       |          | L30      | L34-0691-05 | VHF coil 5φ5T                   |          |
| C110.111 | CC45SL1H221J | C 220pF ±5%         |          | L31      | L40-1021-03 | Ferri-inductor 1 mH             |          |
| C112     | CC45CH1H100D | C 10pF ±0.5pF       |          | L32.33   | L40-1011-03 | Ferri-inductor 100μH            |          |
| C114     | CC45CH1H180J | C 18pF ±5%          |          | XF.(A,B) | L71-0216-05 | MCF 10.695 MHz                  |          |
| C115     | CC45CH1H330J | C 33pF ±5%          |          | VR1      | R12-3025-05 | Trim. pot 10kΩ                  |          |
| C116.117 | CC45CH1H220J | C 22pF ±5%          |          | VR2      | R12-1403-05 | Trim. pot 1kΩ                   |          |
| C122     | CC45TH1H020C | C 2pF ±0.25pF       |          | VR3      | R12-2015-05 | Trim. pot 5kΩ                   |          |
| C123.124 | CC45TH1H100D | C 10pF ±0.5pF       |          |          |             |                                 |          |
| C125     | CC45CH2H070D | C 7pF ±0.5pF        |          |          |             |                                 |          |
| C126     | CC45TH1H030C | C 3pF ±0.25pF       |          |          |             |                                 |          |
| C127.128 | CC45TH1H060D | C 6pF ±0.5pF        |          |          |             |                                 |          |
| C129     | CC45TH1H050C | C 5pF ±0.25pF       |          |          |             |                                 |          |
| C130     | CC45TH1H060D | C 6pF ±0.5pF        |          |          |             |                                 |          |
| C131     | CC45TH1H050C | C 5pF ±0.25pF       |          |          |             |                                 |          |
| C132     | CC45CH1H220J | C 22pF ±5%          |          |          |             |                                 |          |
| C138     | C90-0804-05  | C 0.001μF           |          |          |             |                                 |          |
| C140     | C90-0804-05  | C 0.001μF           |          |          |             |                                 |          |
| C141     | CC45CH1H100D | C 10pF ±0.5pF       |          |          |             |                                 |          |
| C143.144 | CC45CH1H0R5C | C 0.5pF ±0.25pF     |          |          |             |                                 |          |

## PARTS LIST/KEY BOARD ASSEMBLY

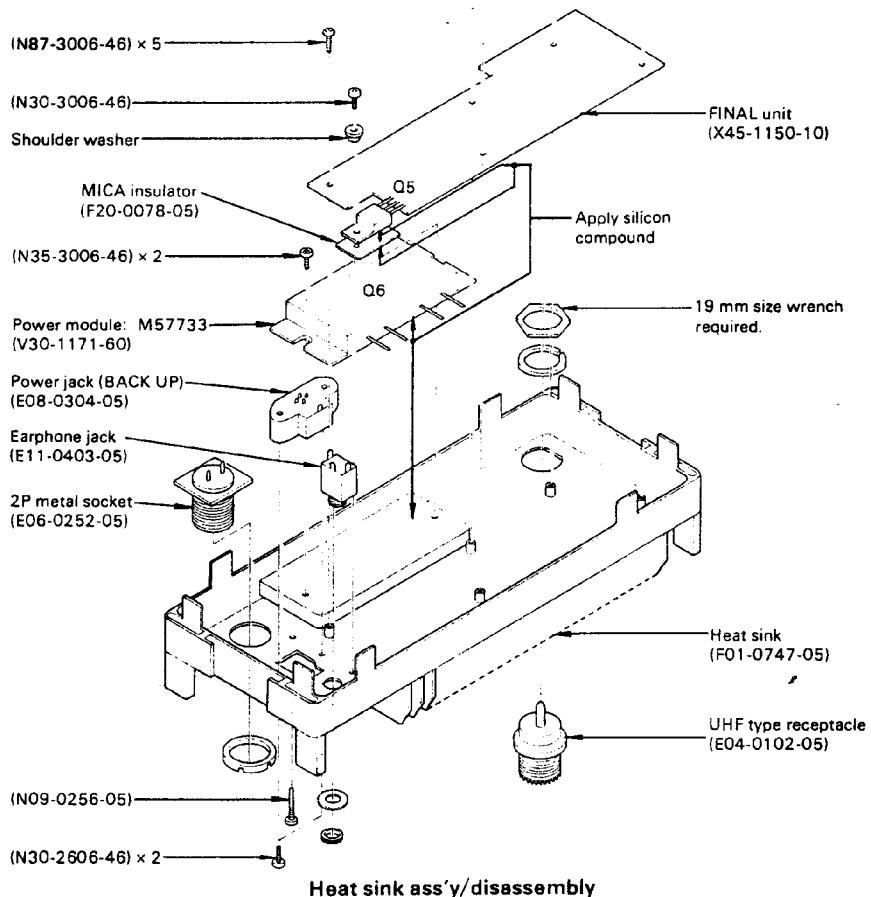
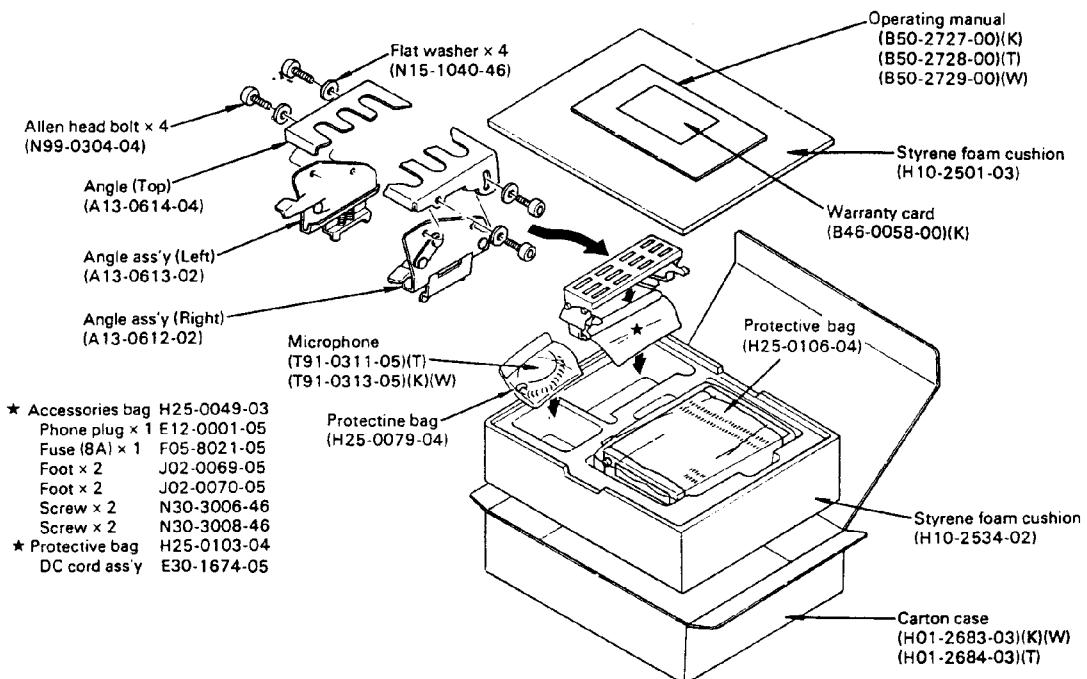
| Ref. No. | Parts No.     | Description    |                   | Re-marks |
|----------|---------------|----------------|-------------------|----------|
| VR4      | R12-0042-05   | Trim. pot      | 500Ω              |          |
| VR5      | R12-2405-05   | Trim. pot      | 5kΩ (W) (T)       |          |
| VR6      | R12-4020-05   | Trim. pot      | 50kΩ (2 pole) (T) |          |
| —        | R92-0150-05   | Short jumper   |                   |          |
| R94      | RC05GF2H560J  | Solid          | 56Ω ±5% 1/2W      |          |
| R132     | R92-0616-05   | Metal film     | 10kΩ (W) (T)      |          |
| R133     | RN14BK2E4703F | Metal film     | 470kΩ ±1% 1/4W    |          |
| R137     | R92-0616-05   | Metal film     | 10kΩ (W) (T)      |          |
| R140     | R92-0617-05   | Metal film     | 7.5kΩ (W) (T)     |          |
| Q1.2     | V09-1002-56   | FET            | 3SK74 (L)         |          |
| Q3~11    | V03-0079-05   | TR             | 2SC460 (B)        |          |
| Q12.13   | V03-1775-06   | TR             | 2SC1775 (E)       |          |
| Q14~16   | V03-1815-06   | TR             | 2SC1815 (Y)       |          |
| Q17      | V01-1015-06   | TR             | 2SA1015 (Y)       |          |
| Q18.19   | V03-1815-06   | TR             | 2SC1815 (Y)       |          |
| Q20      | V30-1045-06   | IC             | HA1366W           |          |
| Q21      | V30-1135-06   | IC             | FS7808C           |          |
| Q22      |               | Not used       |                   |          |
| Q23      | V01-0113-05   | TR             | 2SA496 (Y)        |          |
| Q24      | V03-0336-05   | TR             | 2SC496 (Y)        |          |
| Q25.26   | V03-1815-06   | TR             | 2SC1815 (Y)       |          |
| Q27      | V30-1135-06   | IC             | FS7808C           |          |
| Q28      | V01-1015-06   | TR             | 2SA1015 (Y)       |          |
| Q29      | V03-2240-06   | TR             | 2SC2240 (GR)      |          |
| Q30      | V30-0039-05   | IC             | TA7061AP          |          |
| Q31.32   | V03-0079-05   | TR             | 2SC460 (B)        |          |
| Q33.34   | V09-1014-06   | FET            | 2SK61 (GR)        |          |
| Q35      | V09-1002-56   | FET            | 3SK74 (L)         |          |
| Q36      | V03-2538-16   | TR             | 2SC2538-22-A      |          |
| Q37.38   | V03-0093-05   | TR             | 2SC458(B) (W)(T)  |          |
| D1.2     | V11-0051-05   | Diode          | 1N60              |          |
| D3~6     | V11-0076-05   | Diode          | 1S1555            |          |
| D7~10    | V11-0051-05   | Diode          | 1N60              |          |
| D11      | V11-1262-06   | Varistor       | 1S1212            |          |
| D12      | V11-0076-05   | Diode          | 1S1555            |          |
| D13      |               | not used       |                   |          |
| D14      | V11-0076-05   | Diode          | 1S1555            |          |
| D15      | V11-4163-56   | Zener diode    | XZ-088            |          |
| D16      | V11-0076-05   | Diode          | 1S1555            |          |
| D17      | V11-4101-20   | Zener diode    | XZ-060            |          |
| D18      | V11-4162-66   | Zener diode    | XZ-070            |          |
| D19      | V11-0219-05   | Diode          | V06B              |          |
| D20.21   | V11-0317-05   | Vari-cap diode | 1S2208            |          |
| D22~24   | V11-7761-86   | Vari-cap diode | ITT410            |          |
| D25      | V11-0076-05   | Diode          | 1S1555            |          |
| D26      | V11-0076-05   | Diode          | 1S1555 (W) (T)    |          |
| D27      | V11-0076-05   | Diode          | 1S1555 (T)        |          |

Key board ass'y (S59-0406-05)

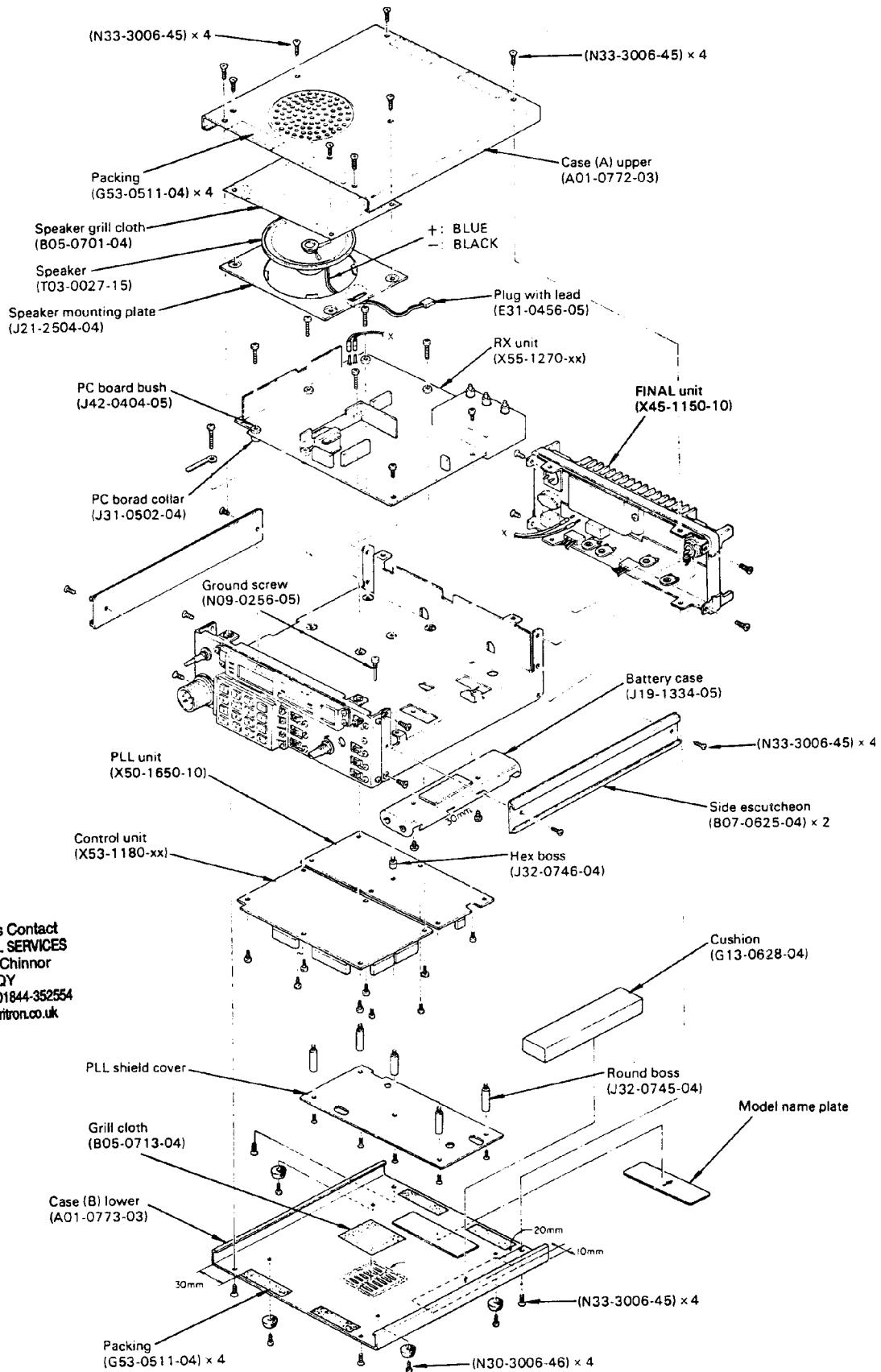


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 Oxon OX9 4QY  
 Tel: 01844-351694 Fax: 01844-352554  
 Email: [enquiries@mauritron.co.uk](mailto:enquiries@mauritron.co.uk)

## PACKING/DISASSEMBLY

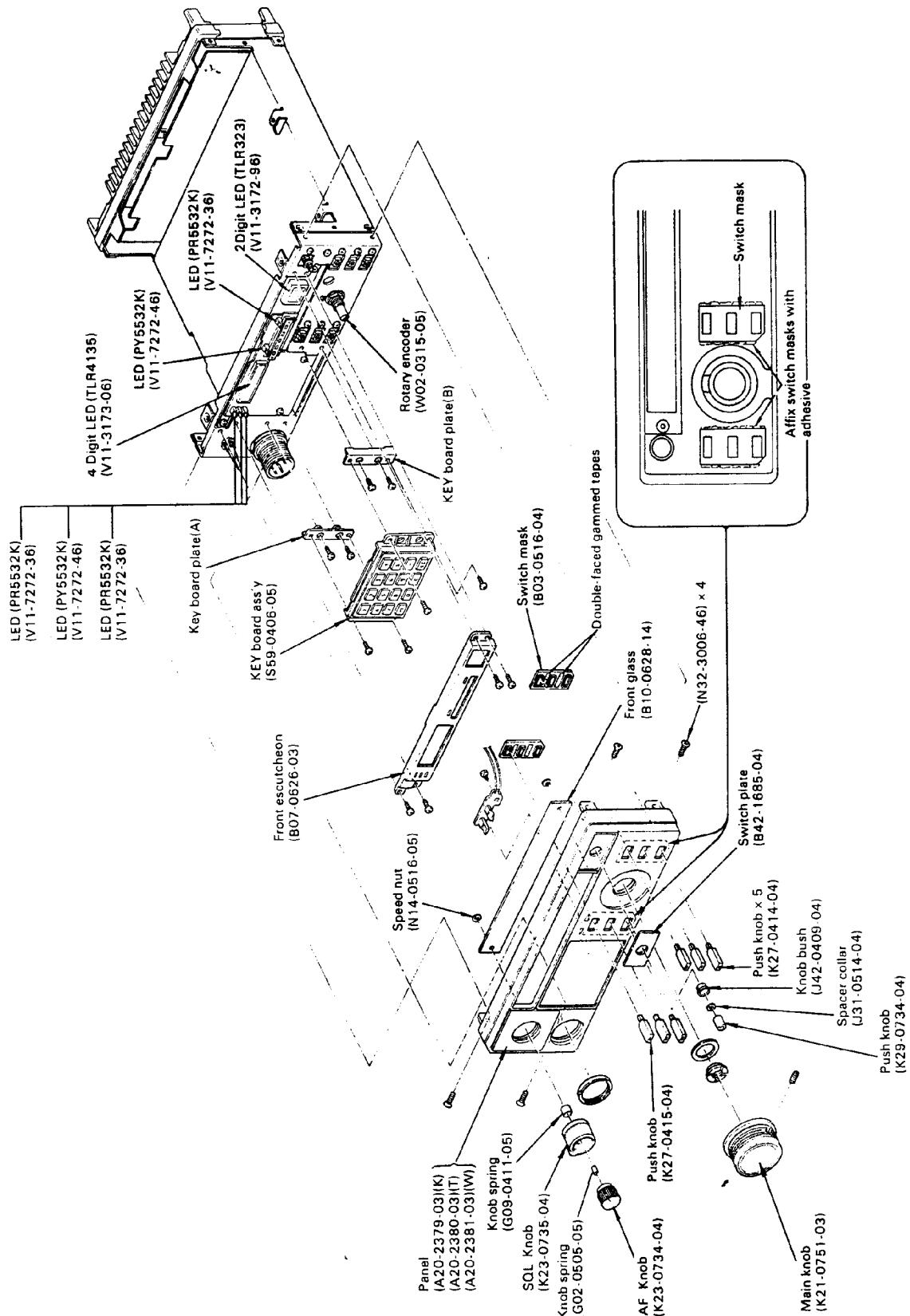


## **DISASSEMBLY**



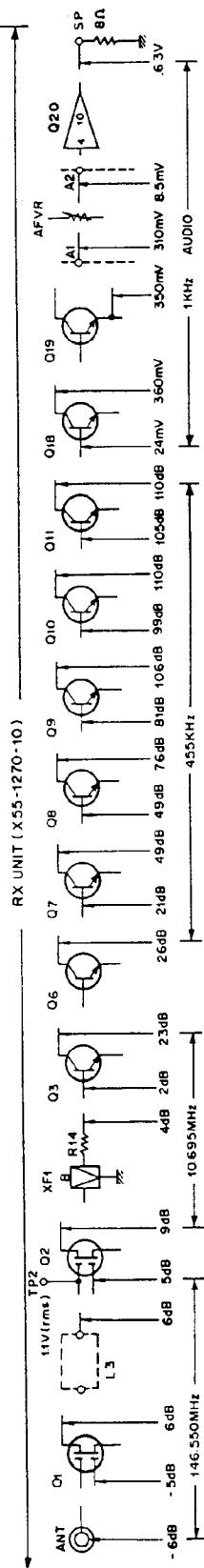
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**Email: [enquiries@mauritron.co.uk](mailto:enquiries@mauritron.co.uk)**

# DISASSEMBLY



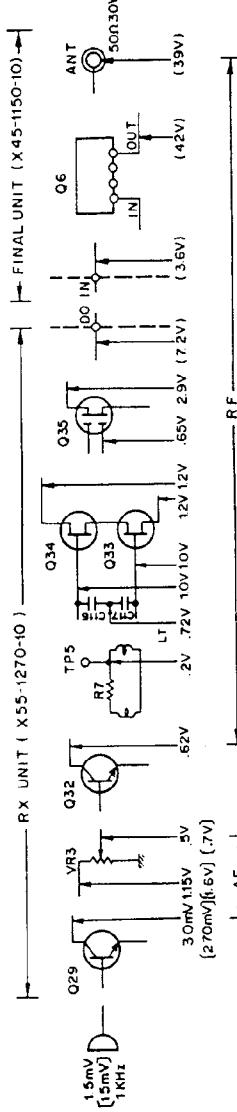
## LEVEL DIAGRAM

### < Receiver Section >



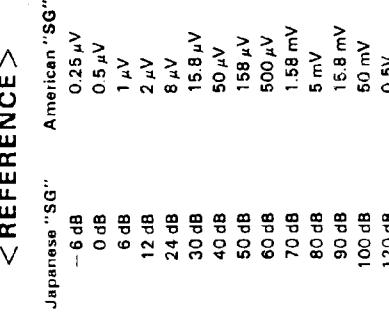
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### < Transmitter Section >



Note:  
 1 In measuring the circuit from the ANT terminal to the collector of Q11, an unmodulated signal of 14.6 550 MHz, -6 dBu, from an SSG was applied to the ANT terminal to obtain a reference NO sensitivity. Then, the SSG output was measured when the NO sensitivity at each SSG signal input point became equal to the reference NO sensitivity.

The SSG output was measured through a 0.01  $\mu$ F capacitor.  
 2 In measuring the circuit from the base of Q18 to the SP terminal, an SSG signal of 14.6 550 MHz, -6 dBu, 1 kHz MOD, 5 kHz DEV was applied to the ANT terminal, and the AF VR was adjusted to obtain an AF output of 0.63V/B0. The signal voltage at each point was measured with an audio V.W.



Note:  
 1. The signal level before DO was measured with the coaxial cable disconnected from DO and the final unit. The signal level after the IN terminal was the level under normal operating conditions.  
 2. The AF unit was measured using an audio V.V., and the RF unit was measured using an RF V.V. (1/100 attenuator used for levels of more than 3V).  
 3. The RF voltages shown in round parentheses ( ) are reference values since they are subject to change according to the positions of the probes  
 4. The AF voltages shown in square parentheses [ ] are values with an input of 15 mV

## ADJUSTMENTS

### <Test Equipment>

1. Tester
  - Input: Sufficient
2. RF VTVM (RF V.M.)
  - Input impedance: 1 MΩ and less than 2 pF
  - Voltage range: F.S. = 10 mV to 300V
  - Frequency range: 150 MHz or greater
3. Frequency counter (F count)
  - Minimum input voltage: 50 mV
  - Frequency range: 150 MHz or greater
4. DC power supply
  - Voltage 10V to 17V variable
  - Current: 6A min.
5. RF Power Meter
  - Dissipation: 20W
  - Impedance: 50Ω
  - Frequency range: 144 MHz
6. AF VTVM (AF V.M.)
  - Input impedance: 1 MΩ or greater
  - Voltage range: F.S. = 1 mV to 30V
  - Frequency range: 50 Hz to 10 kHz
7. AF Generator (AG)
  - Frequency range: 100 Hz to 10 kHz
  - Output: 0.5 mV to 1V
8. Linear detector
  - Frequency range: 144 MHz
9. Directional coupler
10. Oscilloscope
  - With horizontal input and high sensitivity
11. Standard signal generator (SSG)
  - Frequency range: 144 ~ 149 MHz
  - Modulation: amplitude and frequency modulation
  - Output: -20 dB ~ 100 dB
12. AF Dummy load
  - 8Ω, 5W (approx.)
13. Sweep generator
  - Frequency range: 144 ~ 149 MHz

### <Preparation>

Unless otherwise specified, set the controls as follows.

|                |        |
|----------------|--------|
| POWER/VOL SW   | ON     |
| SEND/REC (MIC) | REC    |
| AF VOL         | MIN    |
| SQUELCH VOL    | MIN    |
| KEY M. SEL SW  | KEY    |
| STEP SW        | 10 kHz |
| HI/LOW SW      | HI     |
| PRIORITY       |        |
| { ALERT        | OFF    |
| OPER           | OFF    |
| TONE           | OFF    |

### Notes:

- When adjusting the trimmers or coils, use a non-induced adjusting rod of bakelite, etc.
- When adjusting the RX section never transmit to prevent SSG damage.
- Connect MIC connector as shown in Fig. 18.

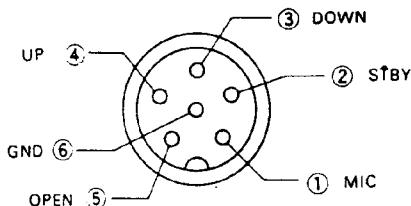


Fig. 17 MIC terminals  
(view from front panel side)

- The output level of SSG is indicated as SSG's open circuit.

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## ADJUSTMENTS

## RX UNIT (X55-1270-10) ADJUSTMENT

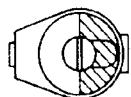
## [TX]

- 10.695 MHz

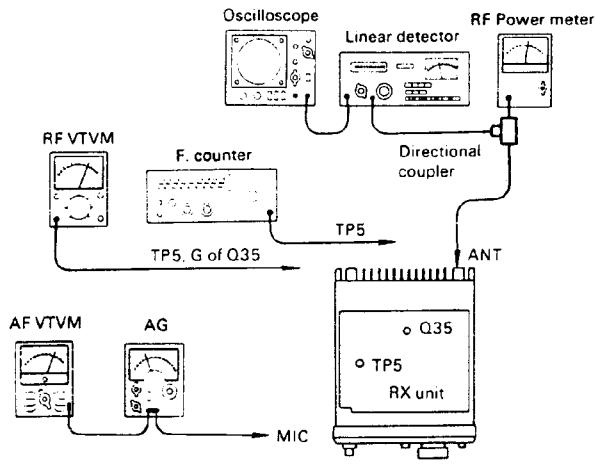
- 1) Unplug the LT connector. Place the unit in transmit mode.
- 2) Connect RF VTVM to TP5 and adjust L20 and L21 for the maximum signal (0.21V rms nominal)
- 3) Connect frequency counter to TP5 and adjust TC1 for 10.6950 MHz.

- 2 VCT circuit

- 1) Connect the LT connector. Adjust the dial frequency to 147.000. Set VR4 to the center position and TC2 to the minimum position. Unplug the DO terminal.



TC2 Minimum position

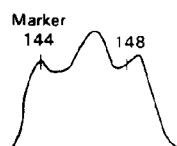
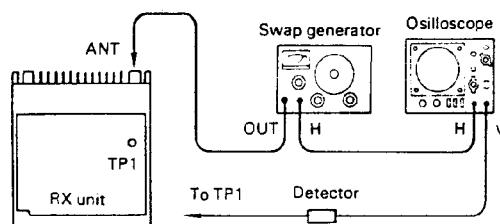


- 2) Connect RF VTVM to Q35 (3SK74) G1 and place the unit in transmit mode.
- 3) Adjust L23, L24, L25 and L26 for maximum signal. Repeat twice. Nominal reading is  $0.8V \pm 0.1$ .
3. Drive adjustment
  - 1) Connect the DO terminal and transmit at 147.000.
  - 2) Adjust TC2 and TC3 for maximum current drain (approx. 31W).
  - 3) Using a spectrum analyzer, adjust VR4 for minimum  $\pm 10.7$  MHz spurious. (VR4 adjusting range: 11 o'clock).
4. Deviation adjustment
  - 1) Connect to a linear detector.
  - 2) Set frequency to 147.000 in transmit mode and apply a signal of 1 kHz, 40 mV to the MIC terminal.
  - 3) Adjust VR3 for 5.0 kHz of deviation.
  - 4) Adjust the AG output level for 3.5 kHz deviation. Check that it is less than 4 mV.

## [RX]

1. Helical adjustment

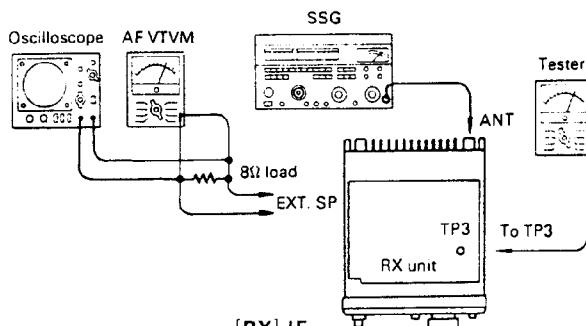
- 1) Connect to a sweep generator.
- 2) Unplug the LR connector (any frequency).
- 3) Adjust L1, L2 and L3 to obtain the waveform shown below (adjust so the 144.0 marker comes to the edge of the helical waveform)



[RX] Helical

2. IF adjustment

- 1) Connect a DC voltmeter, 3V range, to TP3. Reconnect the LR terminal.
- 2) Set frequency to 146.100 and adjust SSG for 10 dB $\mu$  output (1 kHz, 5 kHz dev.).
- 3) Adjust L5, L4 and L6 for a maximum meter indication.
- 4) Adjust L12 for maximum AF output with best waveform.



3. MB voltage adjustment

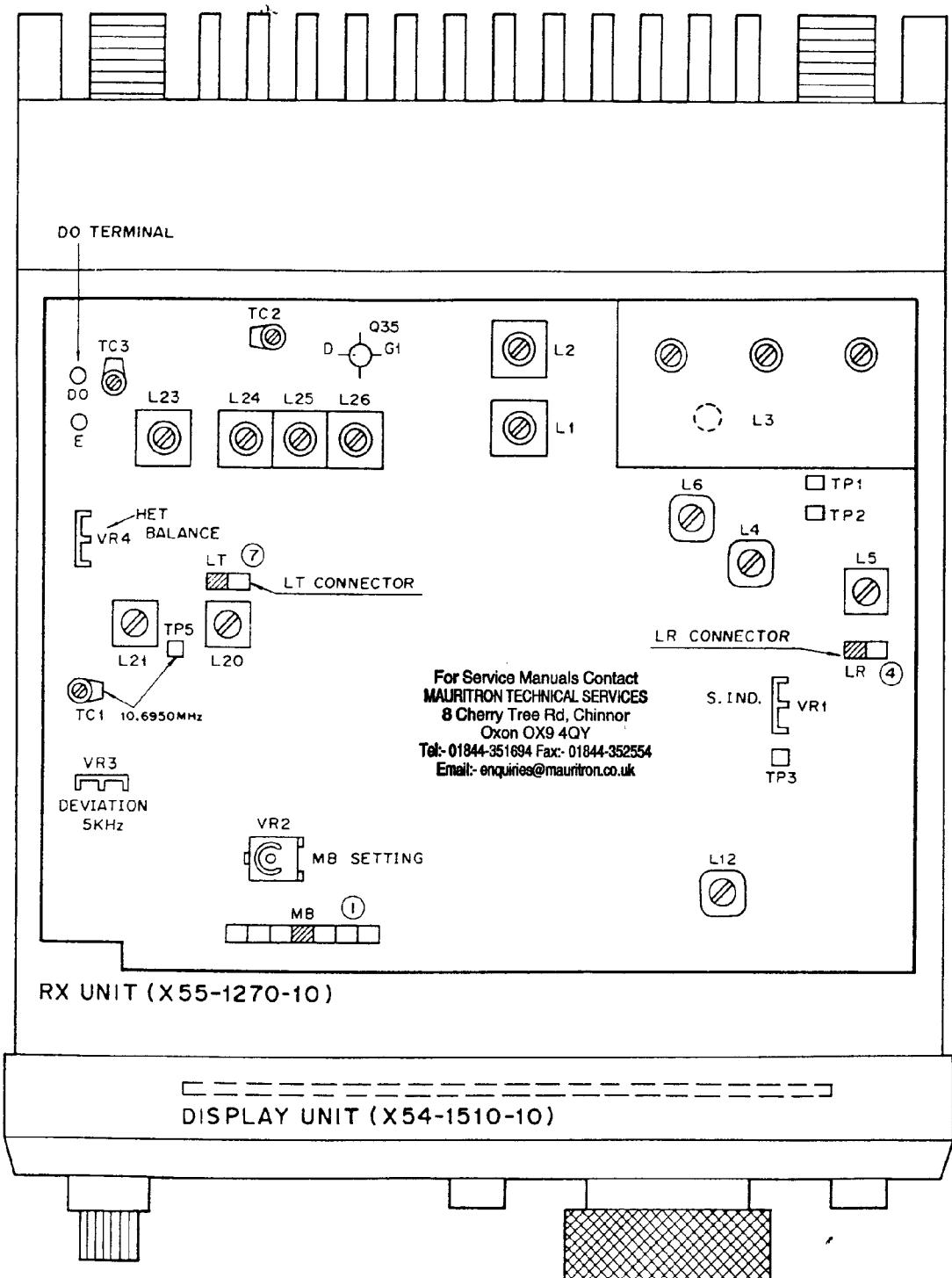
- 1) Connect a DC voltmeter, 6V range, to the harness connector MB terminal. Turn the volume control power SW OFF.

- 2) Adjust VR2 for 5.2V.

4. LED meter adjustment (RX)

- 1) Set SSG to 0 dB $\mu$  and adjust VR1 so that one LED lights.
- 2) Check that all LEDs go off at  $-1$  dB $\mu$  of SSG input.
- 3) Check that 5 LEDs light at 20 dB $\mu$  ( $+10$  dB,  $-2$  dB) of SSG input.

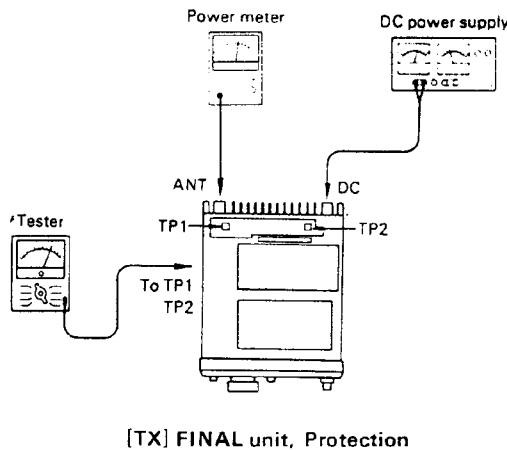
## ADJUSTMENTS



## ADJUSTMENTS

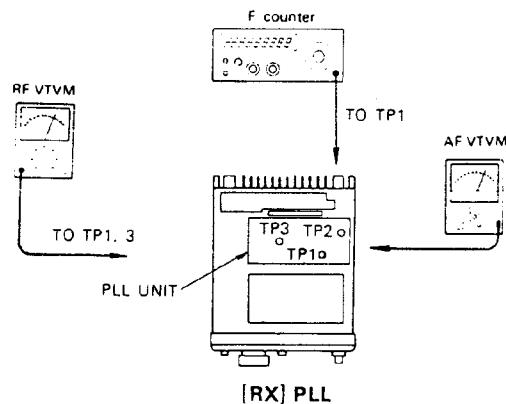
## FINAL UNIT (X45-1150-10) ADJUSTMENT

1. Protection NULL adjustment (TX mode)
  - 1) Set frequency to 147.000 MHz, HI/LO switch to HI power. Connect DC voltmeter (3V range) to TP1.
  - 2) Adjust VR2 for a minimum voltage (less than 0.7V).
2. High power output check (TX mode)
  - 1) Set frequency to 147.000 MHz, HI/LO switch to HI power. Check that total current is less than 6.5A and output is greater than 28W.
  - 2) Check that output at the band edges (139.900 MHz and 148.995 MHz) is within  $\pm 2\text{W}$  of the output at 147.000 MHz and total current is less than 6.5A.
3. Low power output adjustment (TX mode)
  - 1) Set frequency to 147.000 MHz, HI/LO switch to LO power. Adjust VR4 for 5W output  $\pm 0.5\text{W}$ .
  - 2) Check that output at 143.900 MHz and 148.995 MHz is within  $\pm 1\text{W}$  for the output at 147.000 MHz.
3. LED meter adjustment (TX mode)
  - 1) Set frequency to 147.000 MHz, HI/LO switch to HI. Adjust VR1 for all (5) LEDs ON.
  - 2) Place the HI/LO switch to LO and check that 3 LEDs light (the two red LEDs go off).
4. Protection adjustment (TX mode)
  - 1) Set frequency to 147.000 MHz, HI/LO switch to HI. Open the ANT terminal (disconnect the load).
  - 2) Connect a DC voltmeter (12V range) to TP2. With VR3 turned fully counterclockwise, the meter should indicate about 12V. Clockwise adjustment reduces the voltage from about 12V to 6V. Adjust VR3 clockwise approx. 60° from this point and check that the voltage is 5.0 — 6.0V and total current is less than 2.5A.



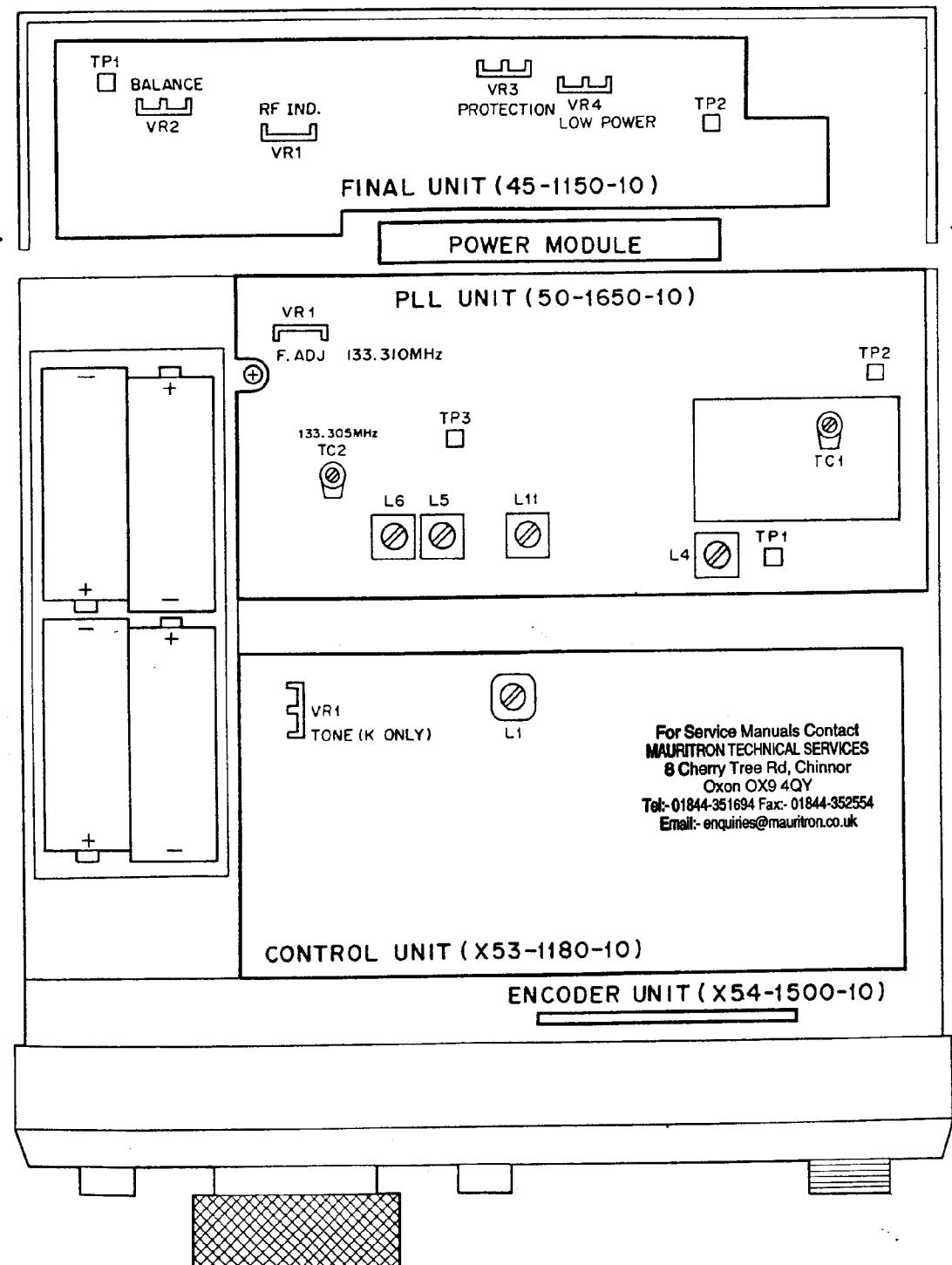
## PLL UNIT (X50-1650-10) ADJUSTMENT

1. IF adjustment (RX mode)
  - 1) Set frequency to 148.995 MHz and connect RF VTVM to TP3.
  - 2) Adjust L11, L6 and L5 for maximum (greater than 0.5V).
2. Lock voltage adjustment (RX mode)
  - 1) Set frequency to 148.995 MHz and connect a DC voltmeter to TP2.
  - 2) Adjust TC1 in the VCO shielded compartment to 7.0V.
  - 3) Reset frequency to 144.000 MHz and check that the voltage at TP2 is greater than 1.9V.
3. Output adjustment (TX mode)
  - 1) Set frequency to 147.000 MHz and connect an RF VTVM to TP1.
  - 2) Adjust L4 for maximum signal (0.2V).
4. Frequency adjustment (RX mode)
  - 1) Set frequency to 144.000 MHz and connect a frequency counter to TP1.
  - 2) Adjust TC2 for 133.305 MHz  $\pm 100$  Hz.
  - 3) Reset frequency to 144.005 MHz.
  - 4) Adjust VR1 for 133.310 MHz  $\pm 100$  Hz.

CONTROL UNIT (X53-1180-10) ADJUSTMENT  
K TYPE ONLY

1. Touch tone deviation adjustment (TX mode)
  - 1) First perform the RX unit Deviation Adjustment in Item 4. After this adjustment, transmit and depress the "5" key.
  - 2) Adjust VR1 for 3 ~ 3.5 kHz deviation.  
(L1: Adjustment is not needed.)

## ADJUSTMENTS

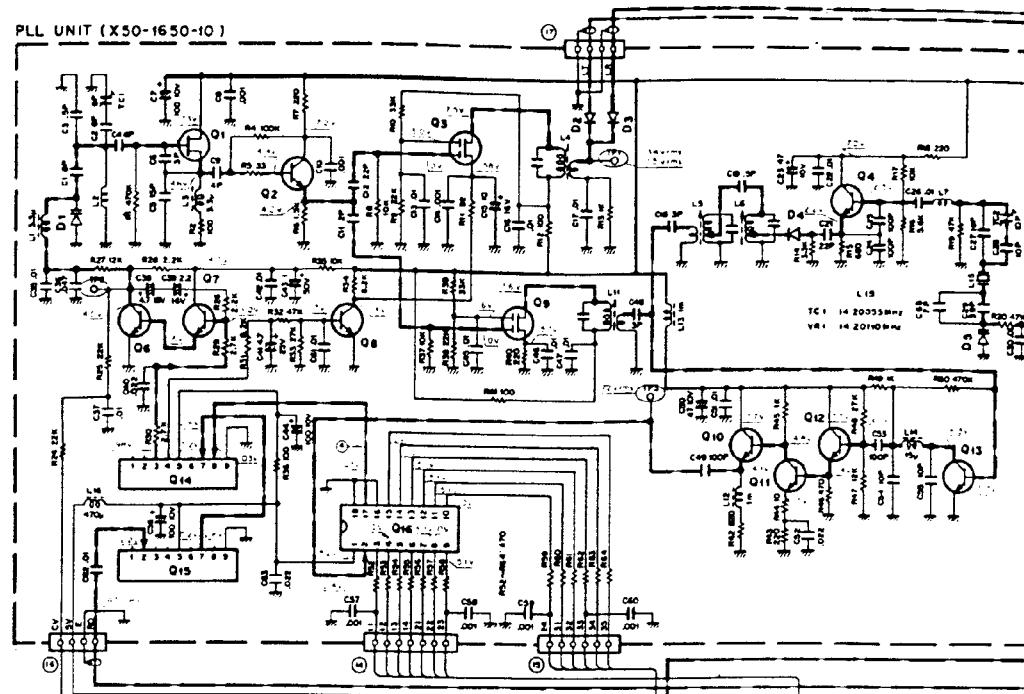


**OPERATIONAL CHECKS**

- 1) Depress the **■** key.
  - 1) The orange **◀** LED will light.
  - 2) Enter frequency.
    - a) The 4-digit frequency display will indicate 3 — 8 MHz.  
When the MHz digit is 3, only 9 should enter as a 100 kHz digit.  
When the 0 — 4 key is pressed, 0 enters as the 1 kHz digit.  
When the 5 — 9 key is pressed, 5 enters as the 1 kHz digit.
    - b) After the full 4-digit frequency is entered, the yellow **S** (Simplex) LED will light.
  - 3) Selecting the TX OFFSET mode.
    - a) The offset mode will enter when the "+" or "-" keys are pressed between the frequency range of 4.000 to 7.995.
    - b) Only the S mode should enter above or below this range.
  - 4) REV SW check
    - a) Set frequency to 4.500 and press the "+" key.
    - b) Press the REV key. The display should indicate 5.100 and the offset mode should indicate "+".
    - c) Release the REV key. The display should again indicate 4.500 "-".
    - d) Press the REV key. The display should indicate 4.500, S. The beeper will sound.
  - 5) "C" key check
    - a) The display should indicate 4.500 S.
    - b) Enter half frequency in the display.
    - c) Press the "C" key. The display should return to 4.500 S.
  - 6) Memory channel selector check
    - a) Turn the memory channel selector to the right. The channel display will continuously count from 0 to 14 in endless sequence.
    - b) Turn the memory channel selector to the left. The channel display will count down from 14 to 0 in endless sequence.
  - 7) "M" key check
    - a) When the memory channel selector is channel in 0 or 14 (K type) (channel 13 or 14 W type).
      - (1) Set frequency to 3.950.
      - (2) Press the "M" key. The beeper will pulse.
      - (3) Set TX frequency to 8.500.
      - (4) Press the "M" key again. The display will indicate 3.950 and the beeper will stop sounding.
    - b) When the memory channel selector is 0 channel 1 — 13 (K type) (channel 0 — 12 W type)
      - (1) Set frequency to 4.270 and TX offset to "+".
      - (2) Press the "M" key and the beeper will sound.
      - (3) Set frequency to 4.270 and the TX offset to "-".
  - (4) The beeper will stop when the "M" key is pressed.
  - 8) "SC" key check
    - a) Press the "SC" key. The radio will scan up continuously while the squelch is closed.
    - b) Open the squelch and the scan will stop momentarily. Scan will resume at approx. 6 second intervals.
    - c) Scan should release when the "C" key or PTT is pressed.
    - d) The scan step will change from 10 kHz to 5 kHz by using the STEP switch.
  - 9) UP/DOWN check
    - a) Connect the UP/DOWN microphone. The radio will scan up by pressing the UP switch and down by pressing the DOWN switch. Scan will stop when both switches are depressed.
    - b) The scan up and down step is determined by the STEP switch.
  - 2) Release the M. SEL **■** key.
    - 1) The orange M. SEL **▶** LED will light.
    - 2) Turn the memory channel selector. The frequency set in item 1, 7) and TX mode will display.
    - 3) Priority alert switch check
      - a) Press the priority alert switch to open the squelch.
      - b) The beeper will sound at about 6 second intervals.
    - 4) Priority operate switch check
      - a) Press the priority operate switch and the channel display will indicate CH 0 (CH 14 for W type). The display will indicate the frequency set in item 1, 7).
      - b) This operation takes precedence over other functions (except during keyboard entry).
    - 5) REV will operate with any memory.
    - 6) The SC (scan) will operate with frequencies stored in memory. All other functions are as outlined in item 1 — 8.
    - 7) The scan will move up or down for the channel as selected by the UP/DOWN microphone switch.
  - 3) Transmit mode checks.
    - 1) Touch tone encoder check.
      - a) Press the 1 — 9, 0, C, and M keys. The signal from the receive monitor should be two tone.
      - b) When two keys are pressed simultaneously, check that the signal from the receive monitor is A single tone.
  - 4) Backup function check
    - a) Turn the power switch ON and OFF. Check that the display frequency is retained.
      - a) When the power switch is turned OFF and ON during scan, the scan should be released.
    - 5) 7.6V DC  $\pm 0.5V$  should be present at the battery case "+" terminal at power SW ON when battery is not loaded.

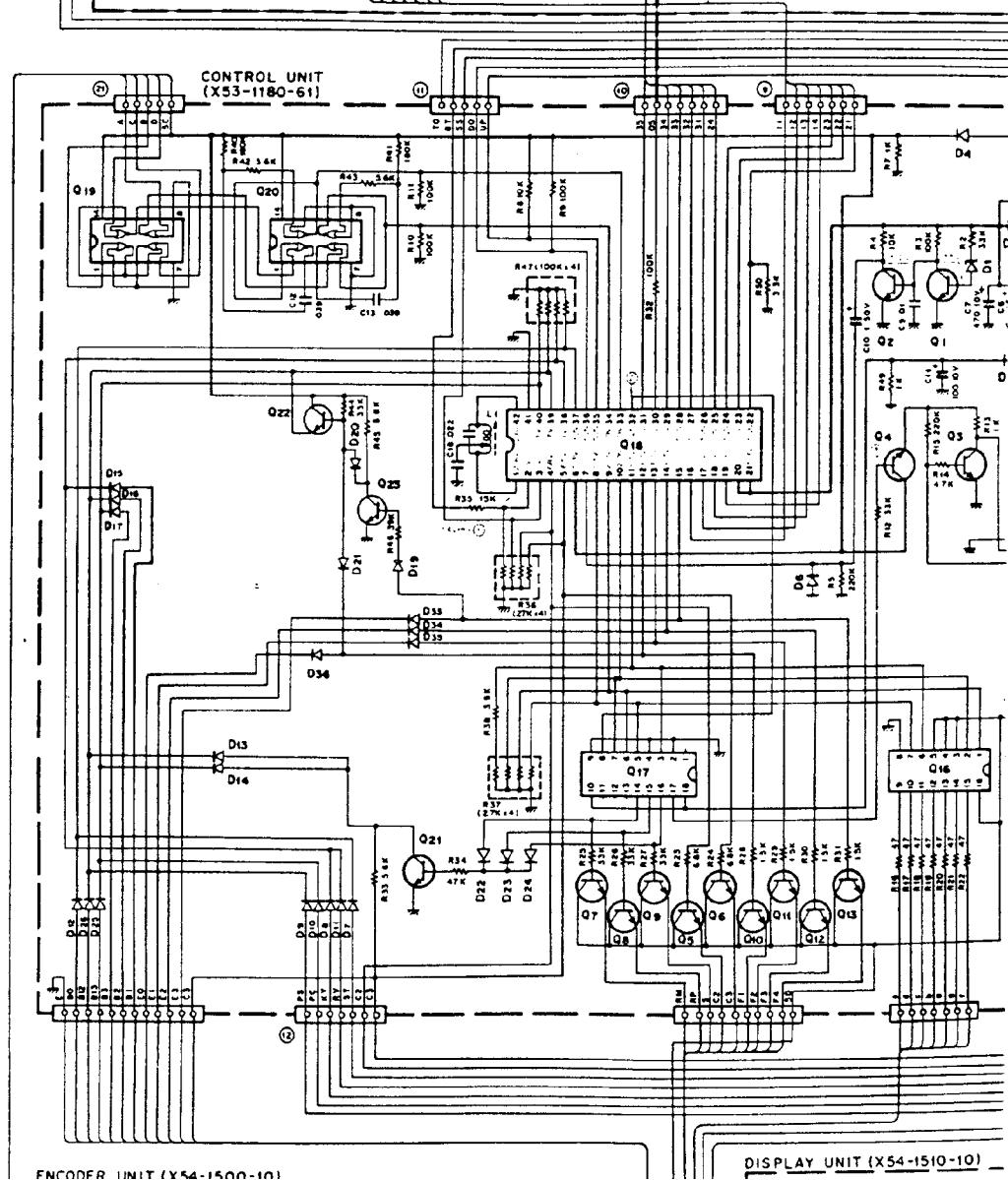
# TR-7800

## SCHEMATIC DIAGRAM (W)



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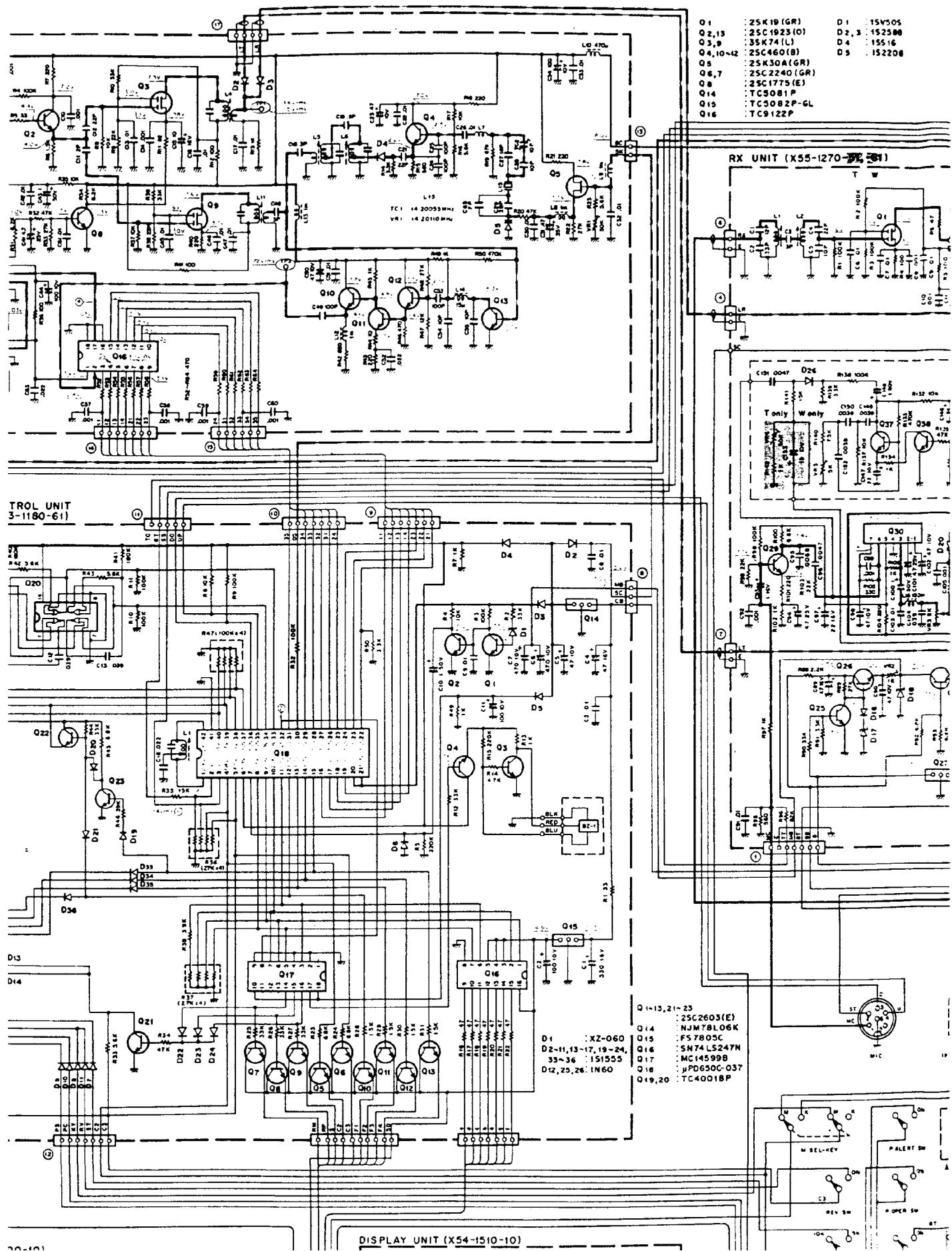
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ENCODER UNIT (X54-1500-10)

DISPLAY UNIT (X54-1510-10)

## **SCHEMATIC DIAGRAM (W) (T)**



### Voltage measure condition

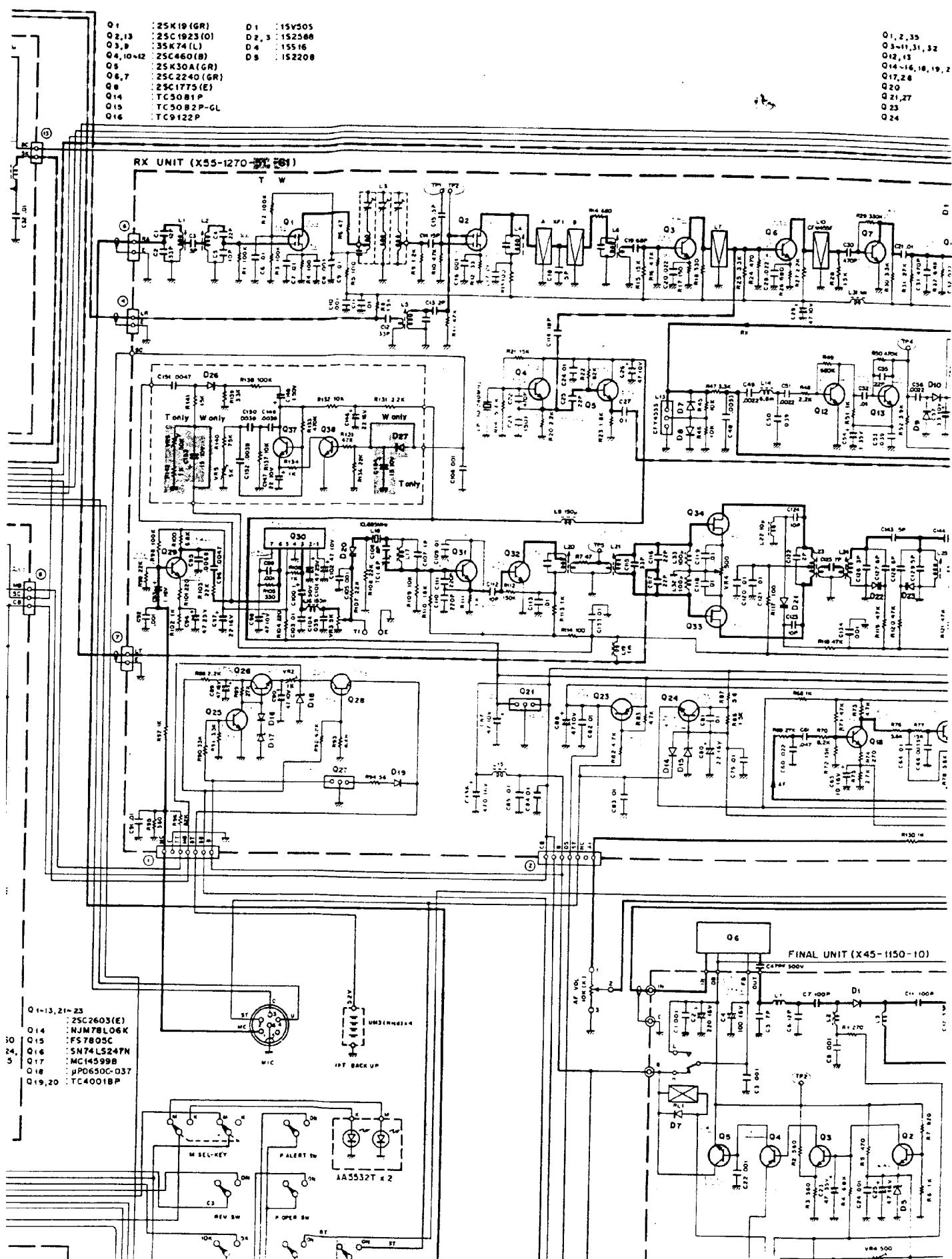
$f = 146.0 \text{ MHz}$

( ) in IX

## Signal

|          |             |      |        |
|----------|-------------|------|--------|
| Q1       | 25K19(GR)   | D1   | 15V50S |
| Q2,13    | 25C1923(0)  | D2,3 | 152568 |
| Q3,p     | 35K74(L)    | D4   | 15516  |
| Q4,10-12 | 25K46(0)    | D5   | 152208 |
| Q5       | 25K30A(GR)  |      |        |
| Q6,7     | 25C2240(GR) |      |        |
| Q8       | 25C1775(E)  |      |        |
| Q14      | TC5081P     |      |        |
| Q15      | TC50B2P-GL  |      |        |
| Q16      | TC9122P     |      |        |

Q 1, 2, 35  
Q 3~11, 31, 32  
Q 12, 13  
Q 14~16, 18, 19, 21  
Q 17, 28  
Q 20  
Q 21, 27  
Q 23  
Q 24

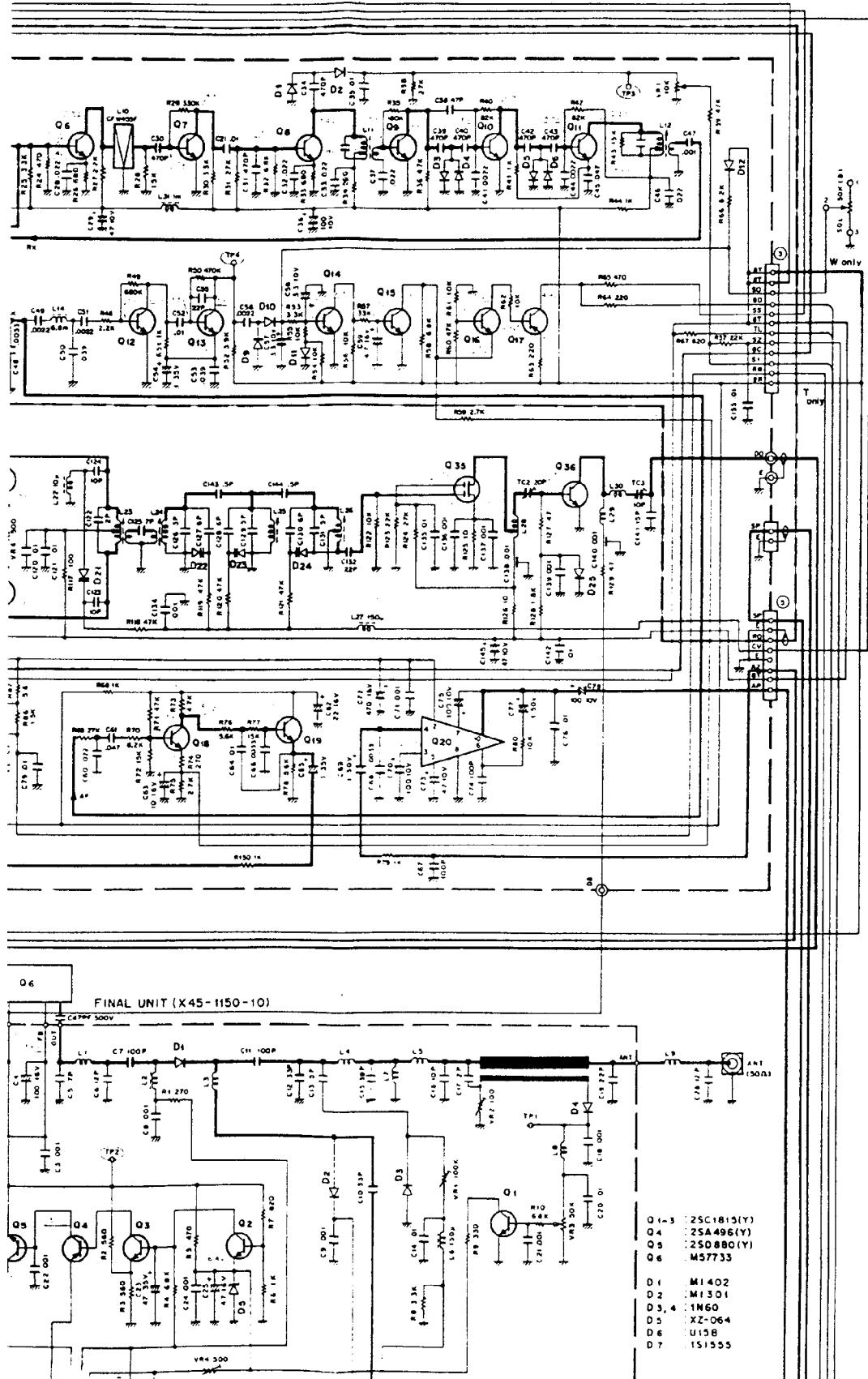


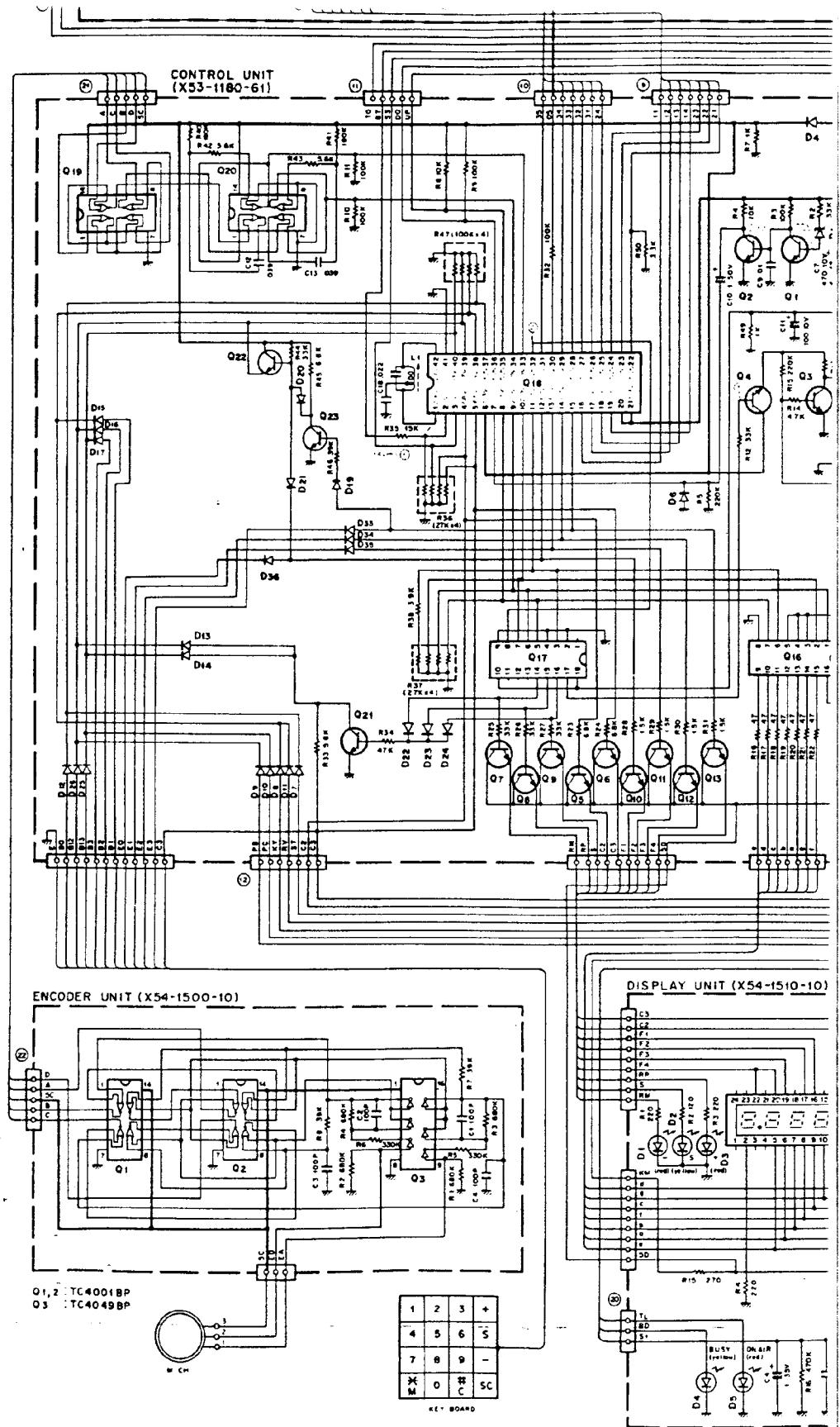
— Signal

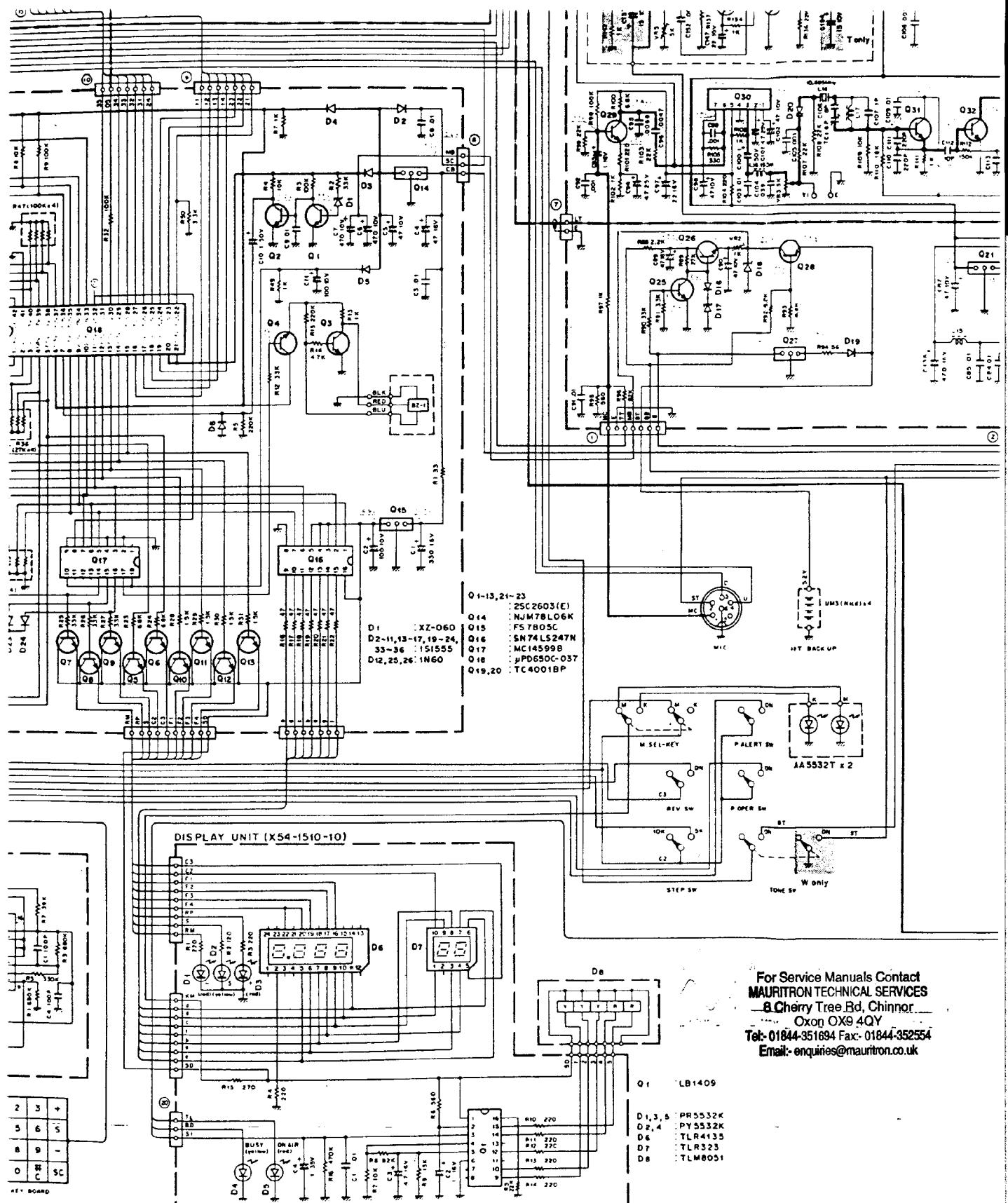
— Control

Common DC line

|                         |             |          |                |                         |        |
|-------------------------|-------------|----------|----------------|-------------------------|--------|
| Q 1, 2, 35              | SSK74(L)    | Q 29     | 25C2240 (GR)   | D 1, 2, 7~10            | 1N60   |
| Q 3~11, 31, 32          | 25C460(B)   | Q 30     | TA7061 AP      | D 3~6, 12~14, 16, 22~27 | 1S1555 |
| Q 12, 13                | 25C1775 (E) | Q 33, 34 | 25K61 (GR)     | D 15                    | 1S1212 |
| Q 14~16, 18, 19, 25, 26 | 25C1815(Y)  | Q 36     | 25C2538 - 2Z-A | D 16                    | XZ-088 |
| Q 17, 28                | 2SA1015(Y)  | Q 37, 38 | 25C458(B)      | D 17                    | XZ-060 |
| Q 20                    | HA1366W     |          |                | D 18                    | XZ-070 |
| Q 21, 27                | F5780BC     |          |                | D 19                    | V068   |
| Q 23                    | 2SA496(Y)   |          |                | D 20, 21                | 1S2208 |
| Q 24                    | 25C496(Y)   |          |                | D 22~24                 | 1TT410 |

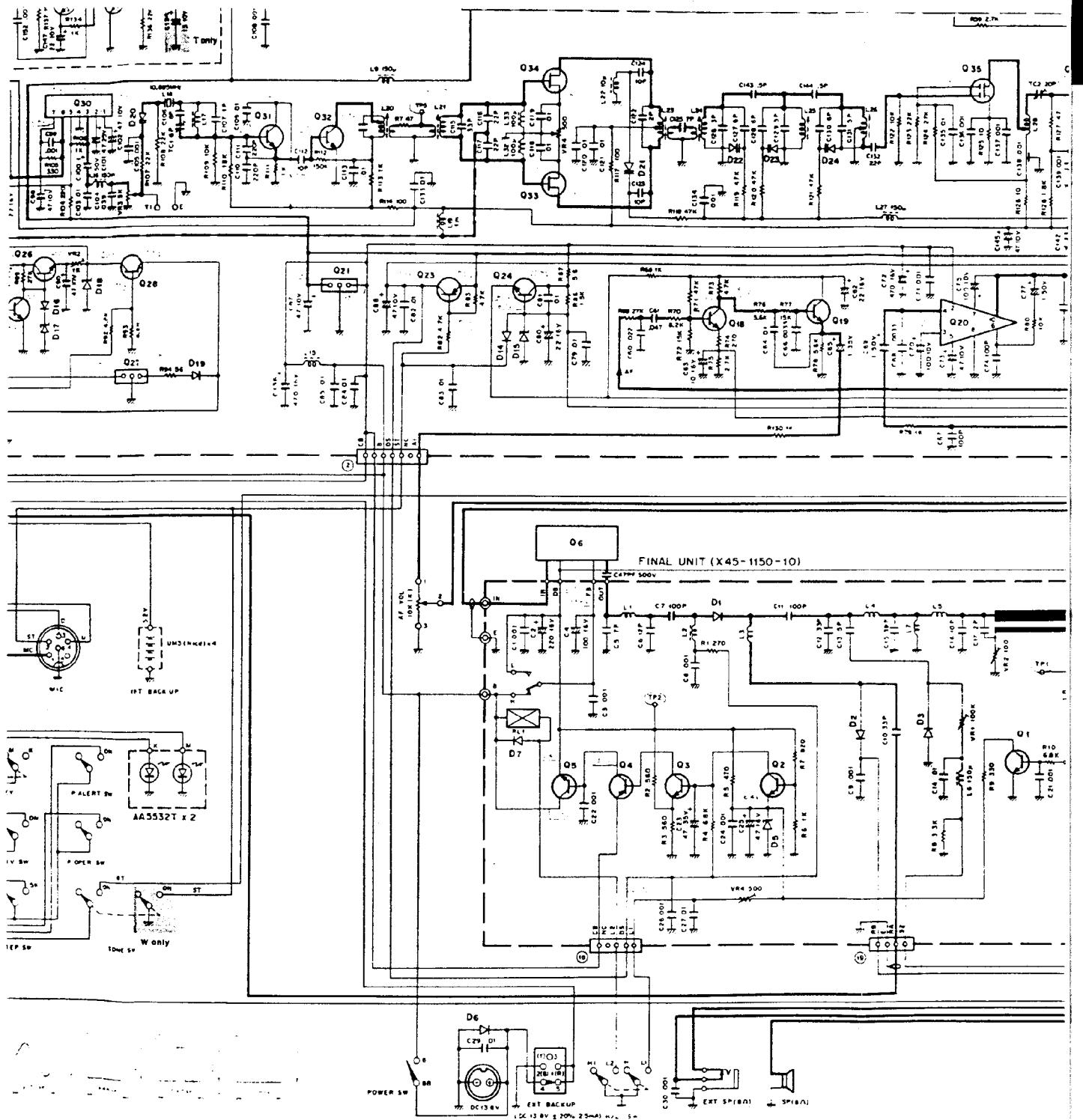






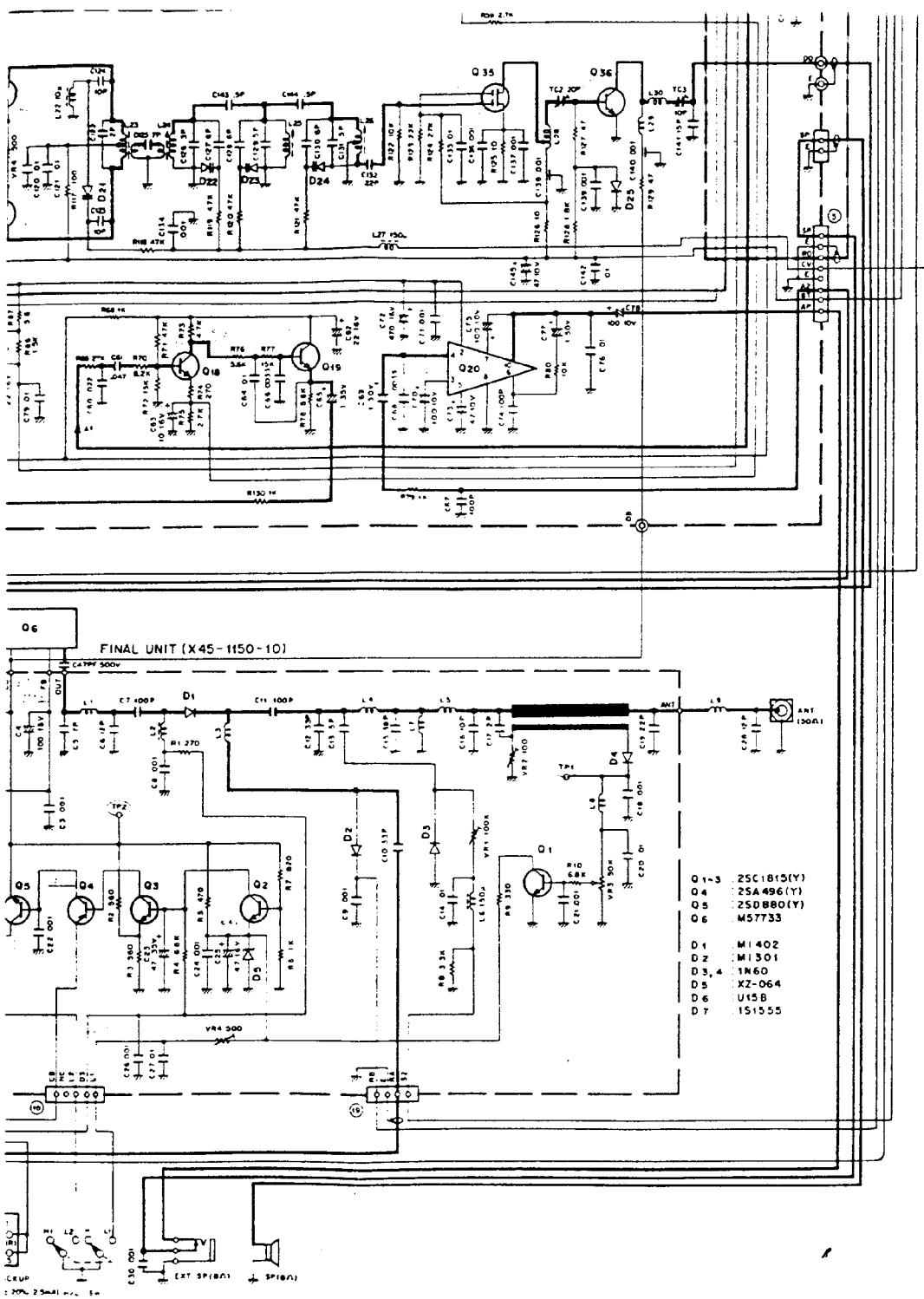
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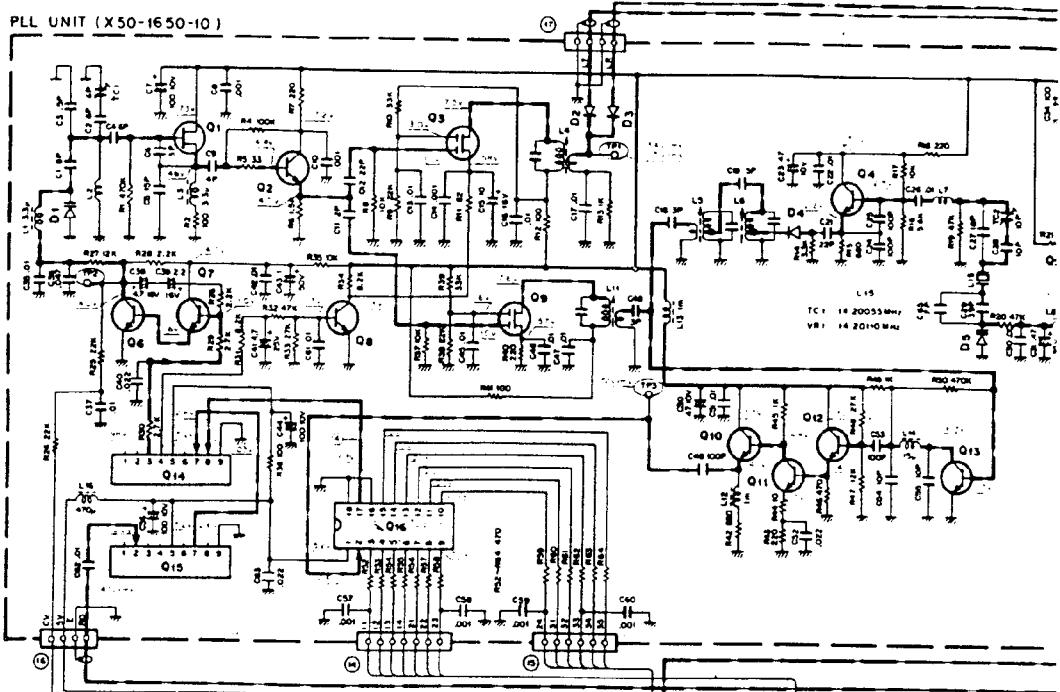
PR5532K  
PY5532K  
TLR4135  
TLR323  
TLM8051



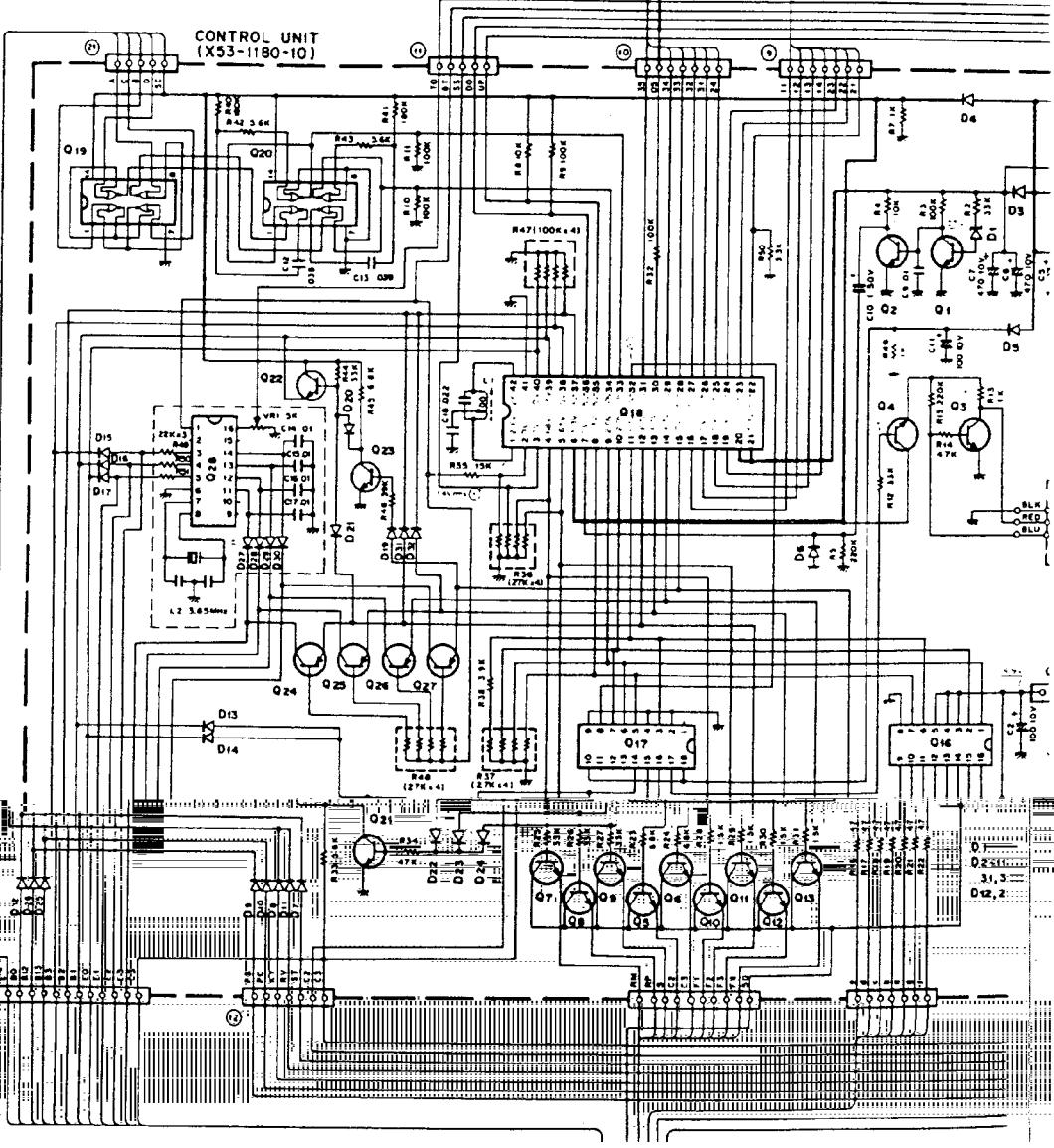
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# SCHEMATIC DIAGRAM (K)



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Voltage measure condition  
 $f = 146.0$  MHz  
( ) : in TX

Signal

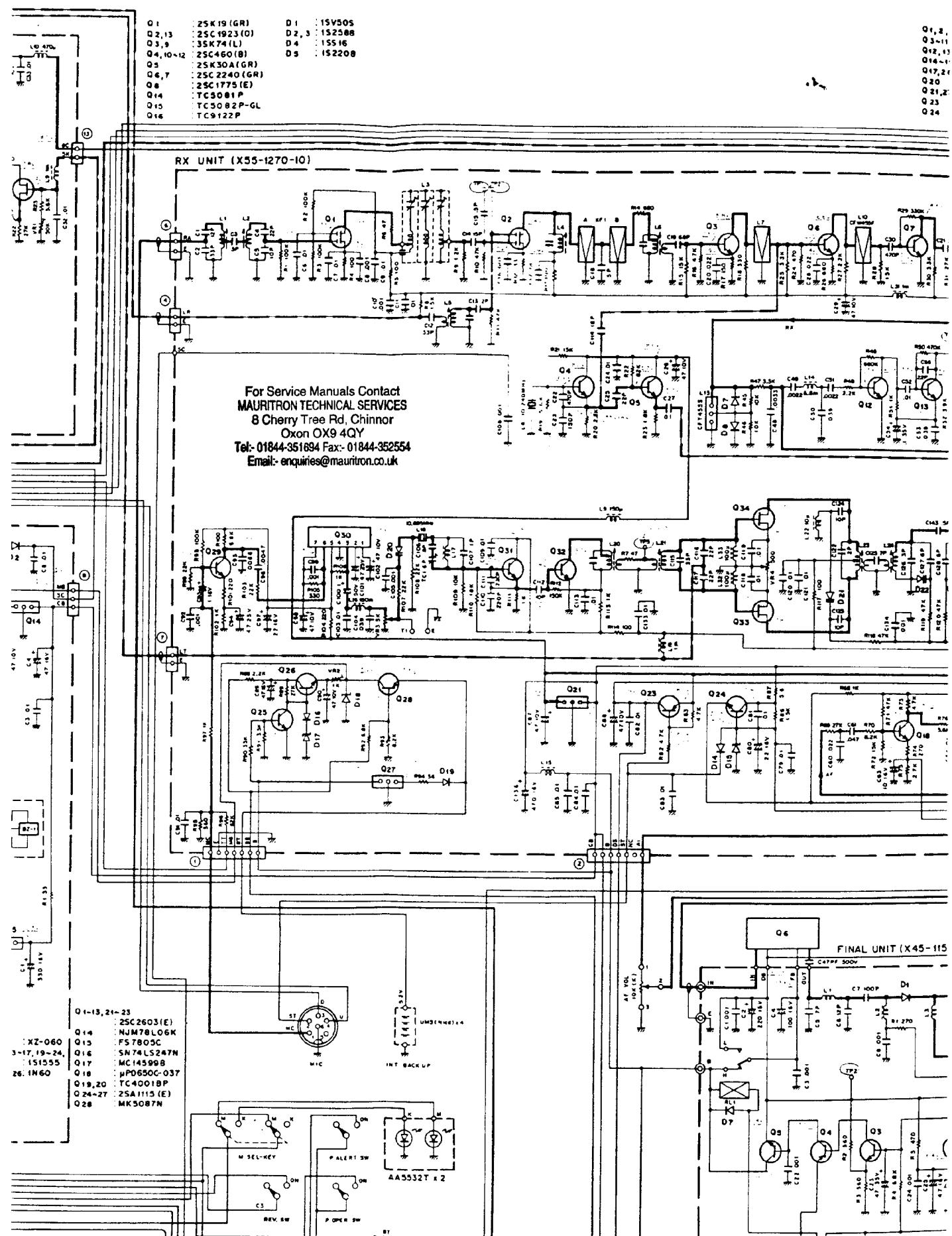
Control

|           |                |        |          |
|-----------|----------------|--------|----------|
| Q 1       | : 2SK19 (GR)   | D 1    | : 1SV50S |
| Q 2,13    | : 2SC1923 (D)  | D 2, 3 | : 1S2586 |
| Q 3,9     | : 3SK74 (L)    | D 4    | : 1SS16  |
| Q 4,10~12 | : 2SC460 (B)   | D 5    | : 1S2208 |
| Q 5       | : 2SK30A (GR)  |        |          |
| Q 6,7     | : 2SC2240 (GR) |        |          |
| Q 8       | : 2SC1775 (E)  |        |          |
| Q 14      | : TC5081P      |        |          |
| Q 15      | : TC5082P-GL   |        |          |
| Q 16      | : TC9122P      |        |          |

Q 1,2,  
Q 3,11  
Q 12,13  
Q 14,15  
Q 17,21  
Q 20  
Q 21,22  
Q 23  
Q 24

RX UNIT (X55-1270-10)

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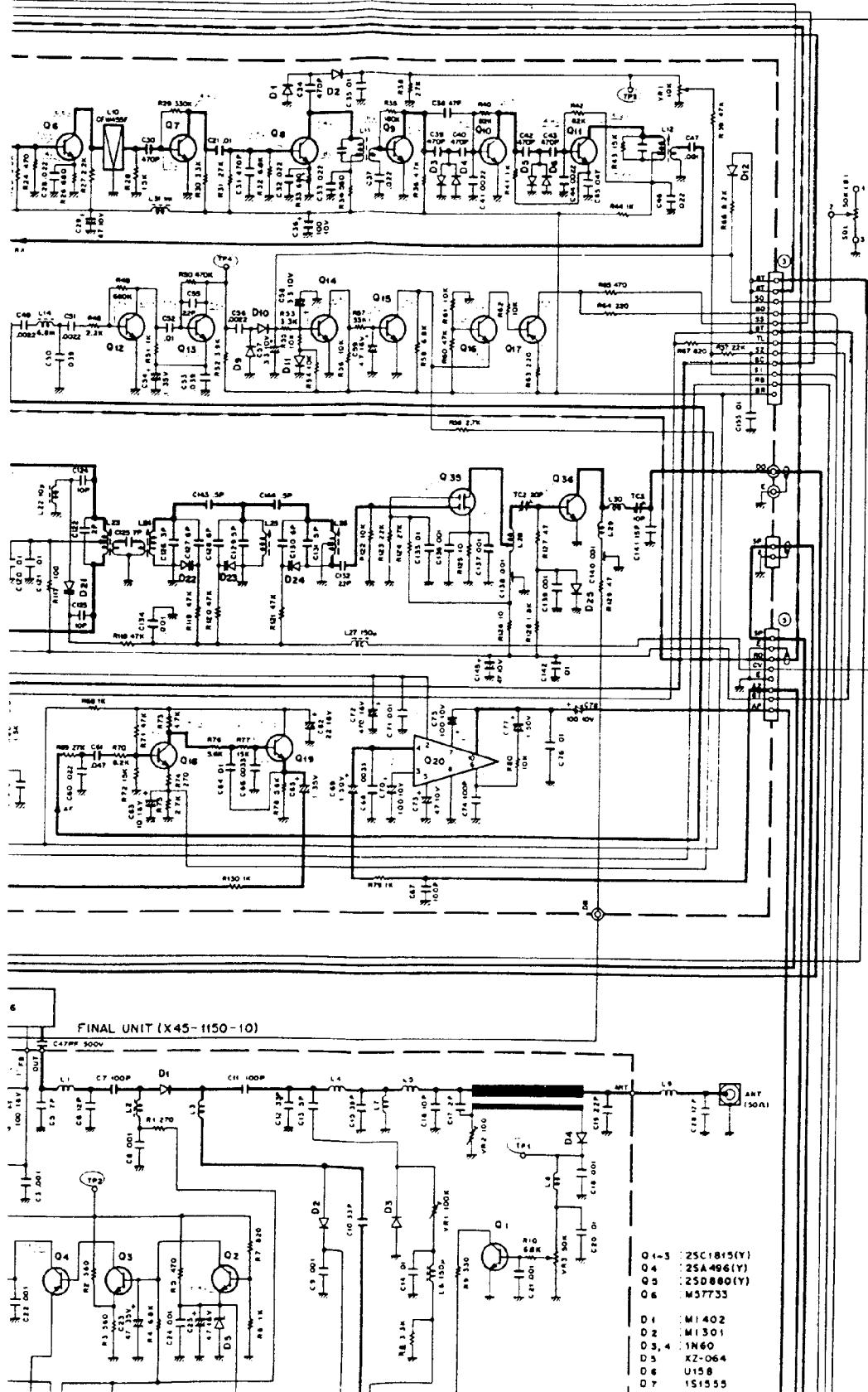


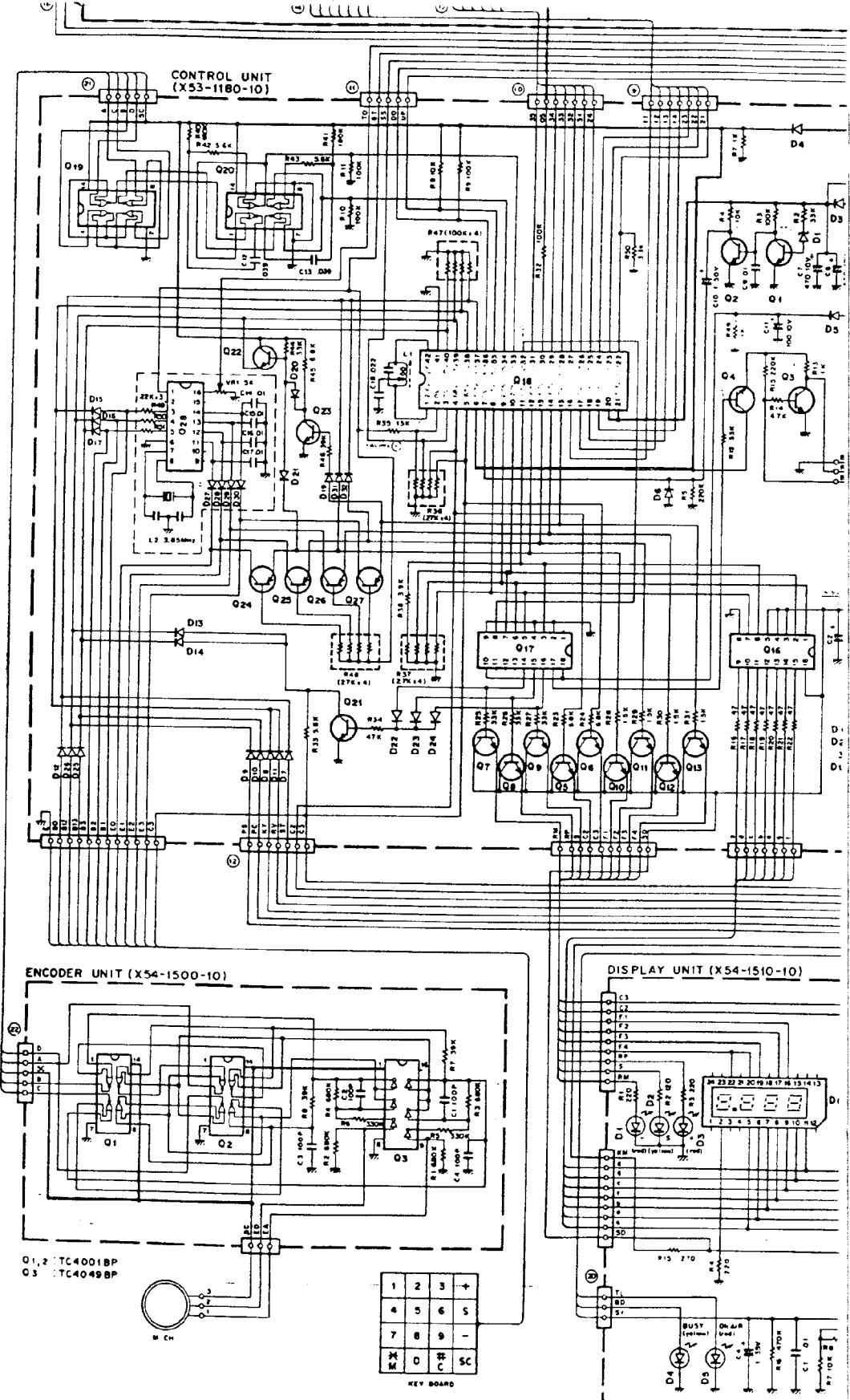
# TR-7800

Control

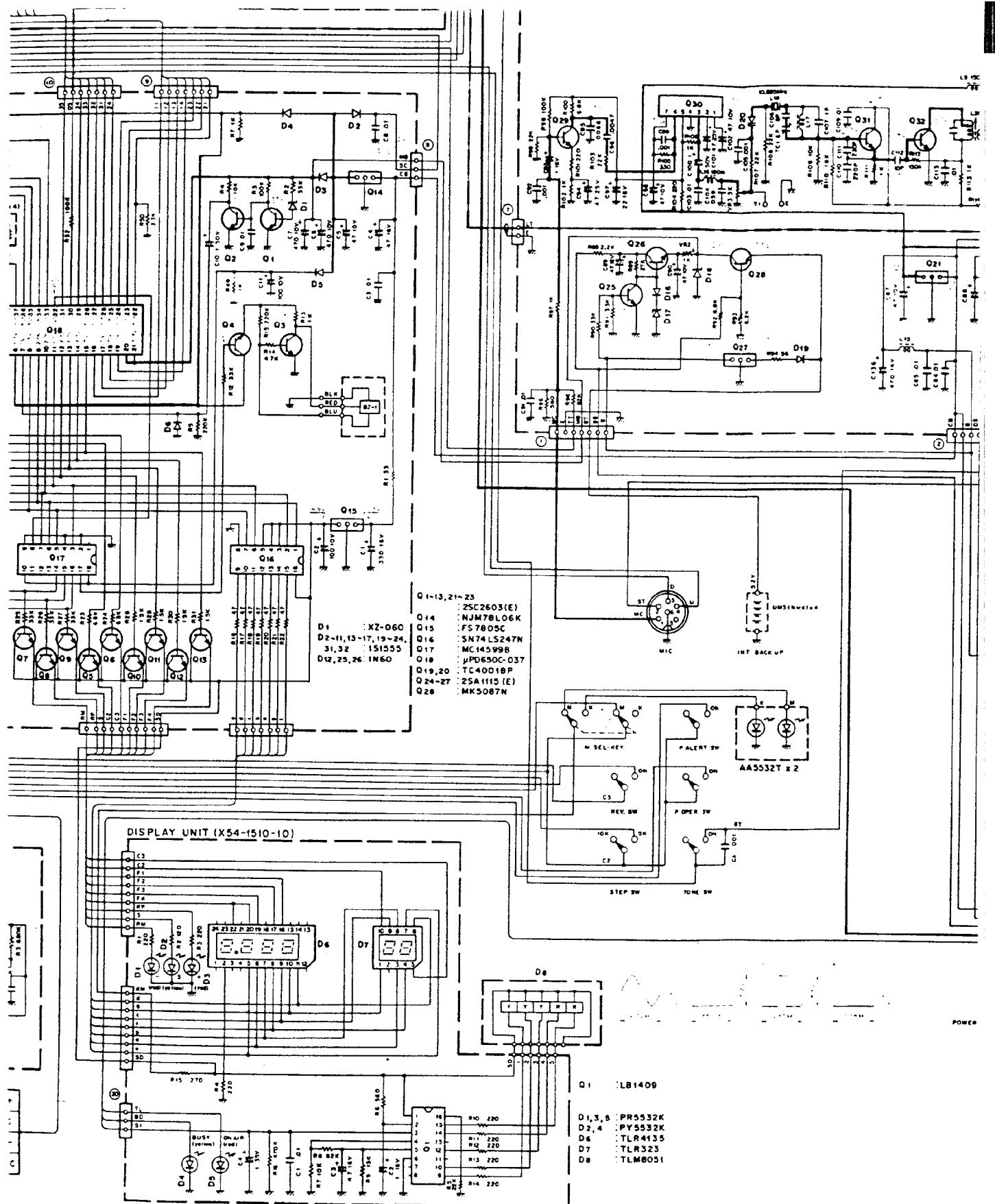
Common DC line

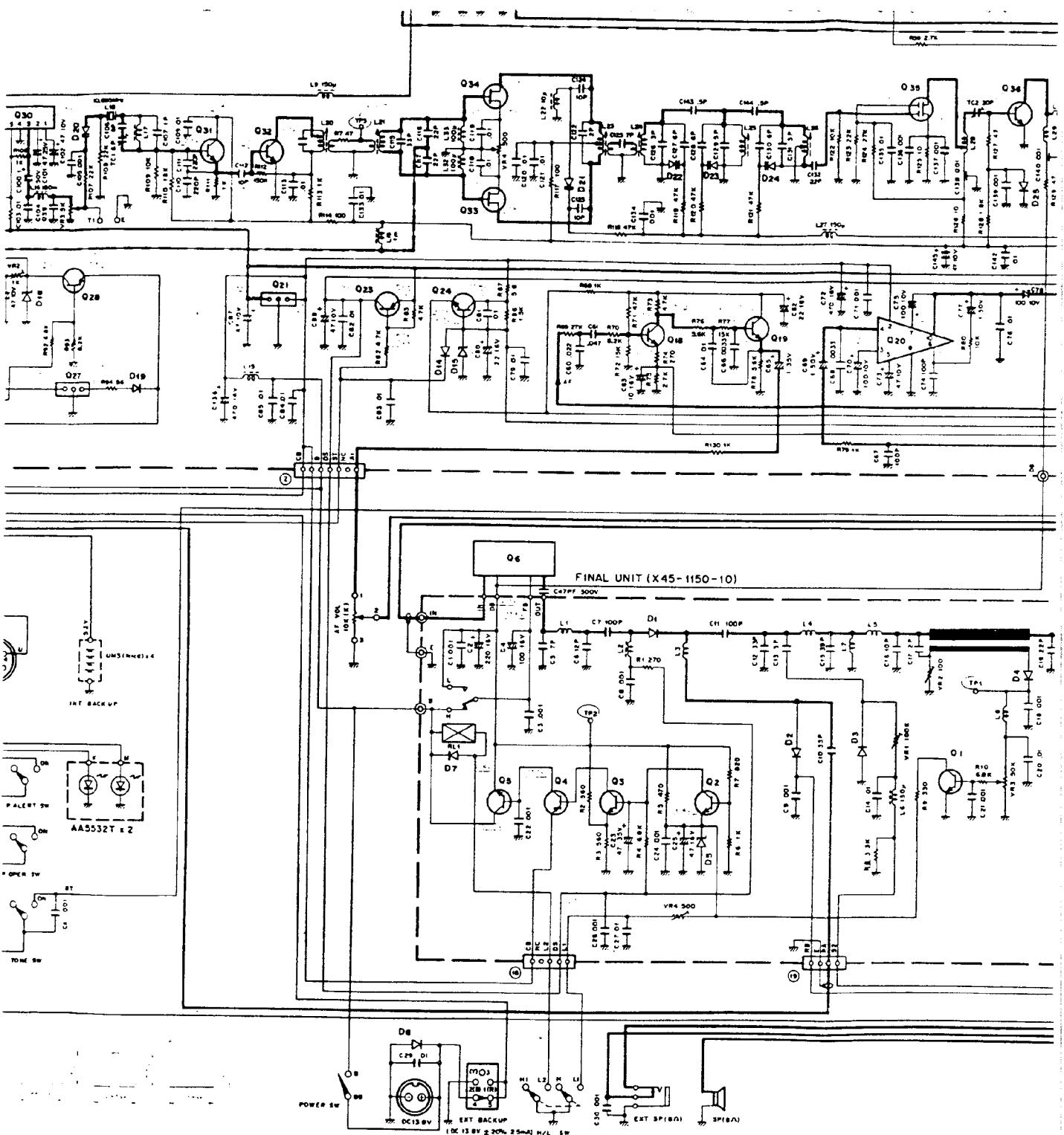
|                    |            |         |              |                      |        |
|--------------------|------------|---------|--------------|----------------------|--------|
| Q1, 2, 35          | 3SK74(L)   | Q20     | 2SC2240 (GR) | D1, 2, 7-10          | 1N60   |
| Q3-11, 31, 32      | 2SC460(B)  | Q30     | TA7061 AP    | D3-6, 12, 14, 16, 25 | 1S1555 |
| Q12, 13            | 2SC1775(E) | Q33, 34 | 2SK61 (GR)   | D11                  | 1S1212 |
| Q14-16, 18, 25, 26 | 2SC1815(Y) | Q36     | 2SC2538-22-A | D15                  | XZ-088 |
| Q17, 28            | 2SA1015(Y) |         |              | D17                  | XZ-060 |
| Q20                | HA1366W    |         |              | D18                  | XZ-070 |
| Q21, 27            | F57808C    |         |              | D19                  | V068   |
| Q23                | 2SA496(Y)  |         |              | D20, 21              | 1S2208 |
| Q24                | 2SC496(Y)  |         |              | D22-24               | 1TT410 |



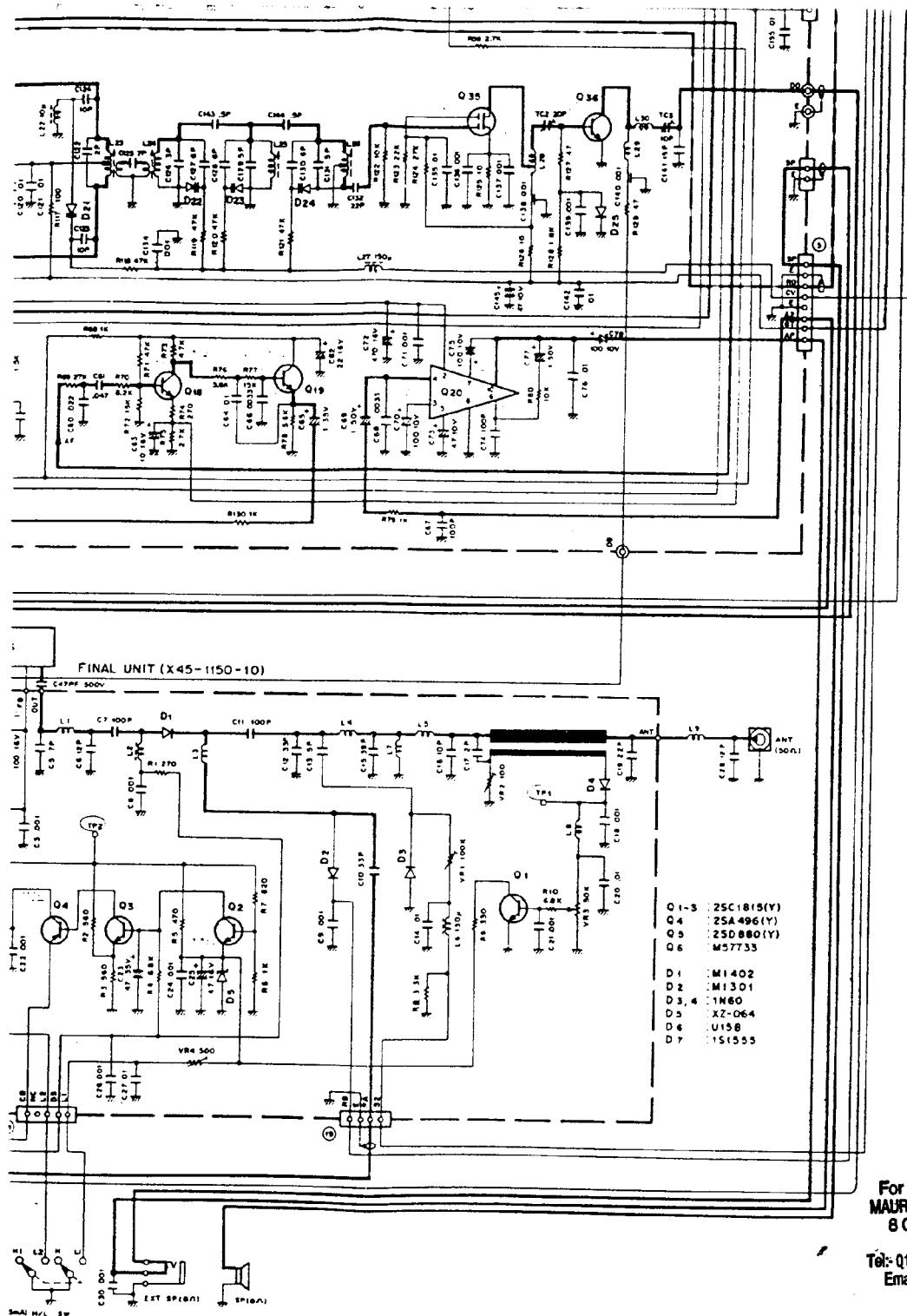


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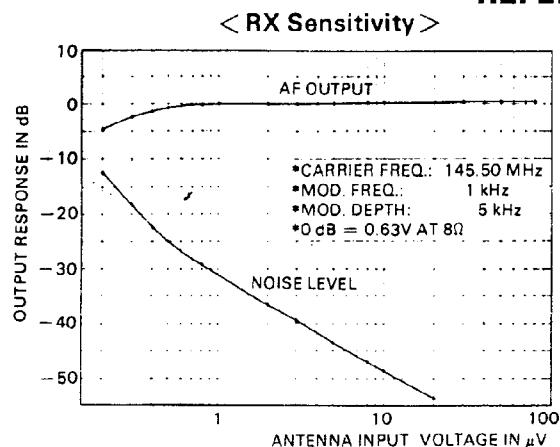
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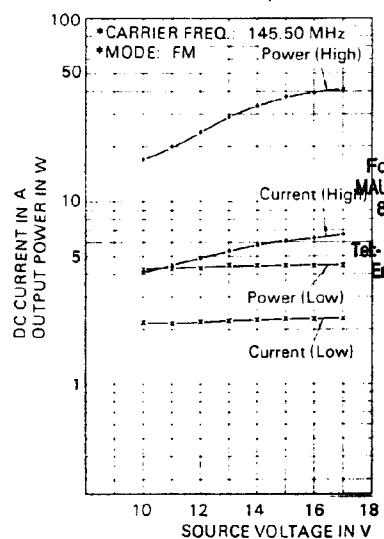
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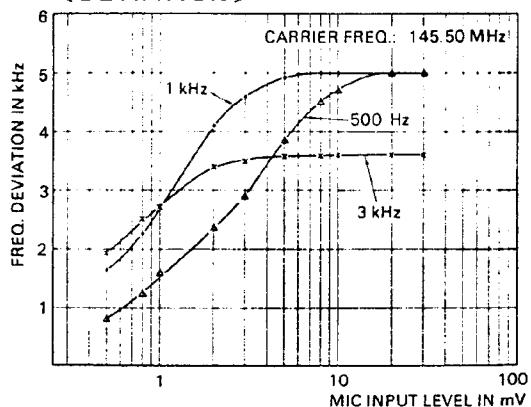
## REFERENCE DATA



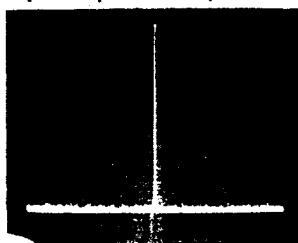
**< OUTPUT POWER/CURRENT >**



**< DEVIATION >**

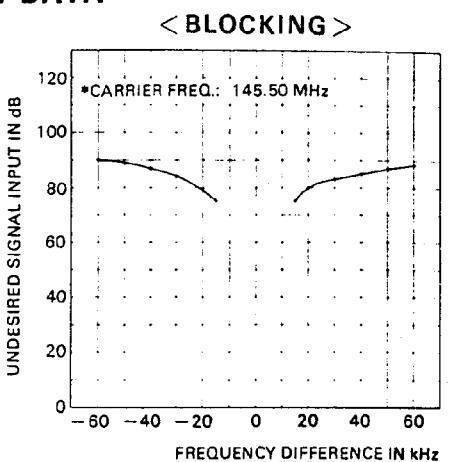


[Near spurious response]

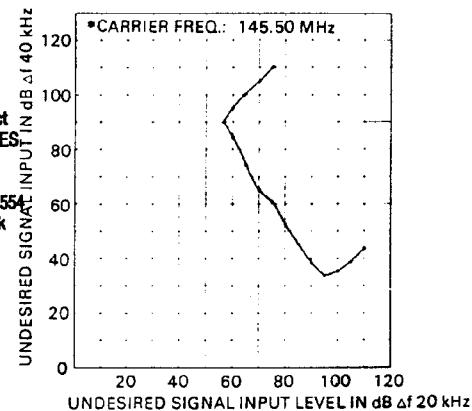


**NOTE:**

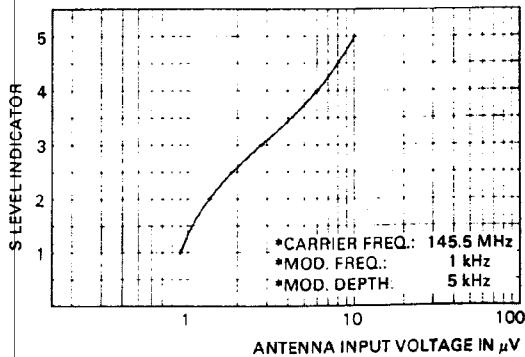
- \* CARRIER FREQ.: 146.00 MHz
- \* RF POWER: 30W
- \* SCAN WIDTH: 5 MHz/DIV
- \* BAND WIDTH: 10 kHz
- \* SCAN TIME: 0.5 SEC
- \* VIDEO FILTER: 10 kHz
- \* INPUT ATT.: 26 dB
- \* LOG REF LEVEL: -6 dBm
- \* 10 dB/DIV



**< INTER MODULATION >**



**< S LEVEL SENSITIVITY >**



[Harmonics spurious response]



**NOTE:**

- \* CARRIER FREQ.: 146.00 MHz
- \* RF POWER: 30W
- \* SCAN WIDTH: 100 MHz/DIV
- \* BAND WIDTH: 100 kHz
- \* SCAN TIME: 10 SEC
- \* VIDEO FILTER: 100 Hz
- \* INPUT ATT.: 26 dB
- \* LOG REF LEVEL: -7 dBm
- \* 10 dB/DIV

# SPECIFICATIONS

| [K type]                                  | [W, T type]  |
|---|--|
| <b>General</b>                            | <b>General</b>   |
| Semiconductors.....                       | Semiconductors.....  |
| MPU      1                                | MPU      1   |
| ICs      19                               | ICs      18  |
| Transistors 60                            | Transistors 58   |
| FETs      9                               | FETs      9  |
| Diodes    77                              | Diodes   78 (W), 79 (T)  |
| Frequency range .....                     | 144.000 to 145.995 MHz   |
| Frequency synthesizer.....                | Digital control, phase locked VCO  |
| Mode.....                                 | FM (F3)  |
| Antenna impedance .....                   | 50 ohms  |
| Power requirement .....                   | 13.8V DC ±15%  |
| Grounding .....                           | Negative   |
| Operating temperature..                   | -20°C to +50°C   |
| Current drain .....                       | 0.4A in receive mode with no input signal  |
|   | 6.5A in HI transmit mode (Approx.)   |
|   | 3A in LOW transmit mode (Approx.)  |
|   | Less than 3 mA for memory back up<br>(from power supply)   |
|   | Less than 2.3 mA for memory back up<br>(from battery)  |
| Dimensions .....                          | 175 mm (6 - 7.8") wide<br>64 mm (2 - 1.2") high<br>206 mm (8-1/16") deep<br>(Projections excluded) |
| Weight .....                              | 2.1 kg (4.63 lbs) (approx.)  |
| <b>Transmitter Section</b>                | <b>Transmitter Section</b>   |
| RF output power                           |  |
| (at 13.8V DC, 50Ω load). HI 25 Watts min. | (at 13.8V DC, 50Ω load)... HI 25 Watts min.  |
| LOW 5 Watts approx. (Adjustable)          | LOW 5 Watts approx. (Adjustable)   |
| Modulation .....                          | Variable reactance direct shift  |
| Frequency tolerance.....                  | Less than $\pm 20 \times 10^{-6}$<br>(-20°C ~ +50°C)   |
| Spurious radiation.....                   | HI Less than -60 dB<br>LOW Less than -53 dB  |
| Maximum frequency deviation (FM) .....    | ±5 kHz   |
| Microphone .....                          | Dynamic microphone with PTT switch, 500Ω   |
| <b>Receiver Section</b>                   | <b>Receiver Section</b>  |
| Circuitry .....                           | Double conversion superheterodyne  |
| Intermediate frequency.....               | 1st IF 10.695 MHz<br>2nd IF 455 kHz  |
| Receiver sensitivity .....                | Better than 0.5µV for 30 dB S/N<br>Better than 0.2µV for 12 dB SINAD                               |
| Receiver selectivity .....                | More than 12 kHz (-6 dB)<br>Less than 24 kHz (-60 dB)  |
| Spurious response.....                    | Better than 60 dB  |
| Squelch sensitivity .....                 | 0.16µV (threshold)   |
| Auto scan stop level .....                | Less than 0.2µV (threshold)  |
| Audio output.....                         | More than 2.0 watts across<br>8 ohm load (10% dist.)   |
|   | (at 13.8V DC, 50Ω load)... HI 25 Watts min.  |
|   | LOW 5 Watts approx. (Adjustable)   |
|   | Modulation .....   |
|   | Variable reactance direct shift  |
|   | Frequency tolerance.....   |
|   | Less than $\pm 20 \times 10^{-6}$<br>(-20°C ~ +50°C)   |
|   | Spurious radiation.....  |
|   | HI Less than -60 dB<br>LOW Less than -53 dB  |
|   | Maximum frequency deviation (FM) .....   |
|   | ±5 kHz   |
|   | RPT. Tone (Burst)<br>frequency.....  |
|   | 1.750 Hz (Burst): (T)  |
|   | Microphone .....   |
|   | Dynamic microphone with PTT switch, 500Ω   |
|   | (at 13.8V DC, 50Ω load)... HI 25 Watts min.  |
|   | LOW 5 Watts approx. (Adjustable)   |
|   | Modulation .....   |
|   | Variable reactance direct shift  |
|   | Frequency tolerance.....   |
|   | Less than $\pm 20 \times 10^{-6}$<br>(-20°C ~ +50°C)   |
|   | Spurious radiation.....  |
|   | HI Less than -60 dB<br>LOW Less than -53 dB  |
|   | Maximum frequency deviation (FM) .....   |
|   | ±5 kHz   |
|   | RPT. Tone (Burst)<br>frequency.....  |
|   | 1.750 Hz (Burst): (T)  |
|   | Microphone .....   |
|   | Dynamic microphone with PTT switch, 500Ω   |

Note: Circuit and ratings are subject to change without notice due to developments in technology.

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